Inside AegisDRAW

JOHN A. S. SKEEL • DAVID BARRETT • WILLIAM VOLK

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AEGIS DEVELOPMENT

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DEDICATION...

This book is dedicated to Brendan E. Volk—both came into the world at about the same time.

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INTRODUCTION

When William Volk first learned about the Amiga computer in early 1985, he was immediately interested in learning more about this "revolutionary" new machine. At first, rumors were more prevalent than factual data, but the overall scheme of things remained consistent. Commodore and Amiga were developing a computer that would change the personal computer industry in several important markets. The market that caught Bill's attention was graphics and Computer Aided Design.

William had a long history working with graphics. From his early days at Avalon Hill to his present position as Technical Director for Aegis Development, his love of computers centered around moving pixels and color. The Amiga seemed like the machine that would make high speed supergraphics affordable.

Once he had the opportunity to use an early prototype machine, Bill knew the die had been cast. People who would have never before considered using a personal computer to create with could turn to the Amiga. He wrote a memo to Aegis President David Barrett.

April 09

MEMO:
TO: D. BARRETT
FROM: W.VOLK
RE: CBM AMIGA MACHINE

Dave -

Opportunity knocks but once....

In the case of the Commodore Amiga, opportunity is breaking down the door and screaming at the top of its lungs "It's 1979 all over again!"

If you turn your WayBack machine to the year 1979, you will recall that this was the year that entire industry grew up around the Apple II. At the time the Apple II presented the industry with some "radical" features. These were:

1. High Resolution (for then) color graphics.
2. Expandability.
3. Reasonable cost.

I think we have the same possibilities with the Amiga...



The Timing on Bill's part was excellent. Aegis was invited to the Amiga Developer's Conference in Monterey, California. Barrett made no secret of his or Aegis' intentions.

April 18

MEMO:
TO: W. VOLK
FROM: D. BARRETT
RE: AMIGA CONFERENCE

Bill -

It seems you'll be attending the Amiga Developer's conference in May. As the preferred development environment for this machine is "C", I've dropped several hundred pages of relevant documentation — along with 9 sixpack's of Foster's off in your area. Please review the data and drink the lager. When you recover, you'll understand our direction. This machine was conceived for the CAD market. We will not miss one second in commencing a developmental project around the Amiga and CAD. When you return from Monterey, all of the fine points should be in place. I look forward to your report.



The Conference was more than Bill or David had bargained for. The reaction to the Amiga was extraordinary. Each new demonstration revealed new power and excitement. The applause from the attending developer's was almost deafening. When Bill returned to Santa Monica, he was already thinking of ways to use the Amiga in designing a CAD software system.

May 29

MEMO:
TO: D. BARRETT
FROM: W.VOLK
RE: MONTEREY CONFERENCE

Dave -

This memo really won't make sense until you see this machine. The Amiga is more than I expected, too good of a computer not to make a lasting impact on the entire industry. The hardware line drawing and area fills will make CAD software perform beyond the level of currently available hardware. More importantly the system multitasks! Plots that take hours won't prevent designers from using the machine. We should make a commitment to "work with" the multitasker in all our Amiga software.

The big surprise was the quality of the documentation for a new computer. I'm also impressed by the structured design of the graphics routines. Multiple window applications should run as fast as single window applications, huge implications in a professional workstation. I can't wait to get my hands on this!!!



Within weeks, Aegis had initiated a project group, headed by Volk, to work with the Amiga and create a series of software projects. The CAD project was labeled "6808".

At first, the plan was to use a series of Amiga computers and one of the early "C" compiler's available for the machine. After some experimentation, it was decided that another route must be used as

the performance of the compiler being tested was only marginal. Manx provided the solution with their Aztec C system.

Bill spent many hours working out the overall specification and design for 6808. Once approval for the project was granted by Barrett, Aegis contracted with Red Shark Software to write the actual code. Bill continued to supervise and participate in the project.

The approved development system included a 512K Amiga, 1MB RAM upgrade, 20 MB hard disk, and the Sony KV1311CR RBG monitor. The Aztec compiler was used along with Metacomco's editor and some Aegis development tools.

Aegis Draw uses the Amiga FFP (fast floating point) math libraries for faster math operations. All Draw data files are text files that can be edited with ED, TxED, or other Amiga text editors. The file requestor was created by Charley Heath of MicroSmiths Inc. and converted into Aztec C by William Volk. The graphics system used in Aegis Draw is based on portions of the GKS and CORE graphics systems. Aegis Draw allocates memory "on the fly" for all graphics objects, and will take advantage of additional FAST memory.

By the end of November, a basic shell had emerged. Simple tools were working and a drawing could be created. The press were given a demonstration of Aegis Draw at the Fall Comdex in Las Vegas. Red Shark slowed development while Commodore updated the Amiga Intuition software environment from 1.0 to 1.1.

Aegis Draw was first shown to the public in January of 1986 at the Consumer Electronics Show in Las Vegas. By this time, plotter support had been added and the user interface began to take hold. The developmental process was accelerated. Design work was begun on Aegis Pro-Draw.

No computer system can be regarded as a success without complimentary and widely available software. Never before has a full featured CAD

product been available on such an inexpensive machine. Finally, the price of the software allowed even the most casual computer user to take advantage of the opportunity provided by the Amiga. The Aegis Draw project represents a three way commitment to the Amiga, the CAD market, and to the computer consumer.

For William Volk, Aegis Draw is a labor of love. For Aegis, it represents the company's premier product line. The following pages will take you through Aegis Draw step by step, window by window. Enjoy.

SECTION

1

GETTING STARTED

CHAPTER

1 CAD Concepts

How to Use This Book

Inside Aegis Draw is broken into three separate sections. Section One provides first time users with an overview of the CAD environment and some of the possible uses for CAD software. If you are an experienced user, you probably aren't even reading this. You're probably looking at Section Two, the tutorial describing the functions of Aegis Draw and how to create a drawing. Section Three is a reference section for advanced users. Also, Appendix A contains a list of commands by menu with references to more material. As you read through the book, feel free to jump around from section to section looking for the data most important to you.

In this book we use a different typeface when referencing menu commands. The word will appear in bold as you would see it on the screen. This type of type change is used when the command is being described directly to avoid confusion.

CAD and Aegis Draw

CAD is an acronym for Computer Aided Design. Engineers, designers, architects, graphics artists are among the groups of professionals that use CAD systems. A CAD software system uses the computer's ability to process, store, retrieve, and display accurate computer graphics.

Aegis Draw is a CAD program for creating accurate scaled drawings. It creates a "database" for the elements of the drawing, and allows you to view any section of the drawing — even multiple sections at the same time!

The Amiga display acts like a "window" into the drawing. The drawing can have a far greater resolution than the actual display. For example, you may zoom into the *elevations.drw* drawing (provided on the demo disk) to a point where the display is smaller than the dot on the letter "i". The display is just a representation of what is in the database — more on this later on.

Aegis Draw is a multi-window software system. If you have 512K of memory you may open two windows. These may be separate drawings, or different views/windows of the same drawing. Expansion memory beyond 512K will give Aegis Draw even more flexibility and additional windows to work with. Adding a hard disk system will allow for rapid access to data and parts. Remember, Aegis Draw is not copy protected and can be loaded and operated using a variety of hard disk systems.

Since Aegis Draw maintains a database of the drawing elements, you can select elements and drag, clone, rotate, and size them just by clicking on their borders. Unlike a paint system Aegis Draw knows what is on the display. If you decide to move a circle, Aegis Draw will know where the circle is in the drawing. The elements that make up the display have "real" coordinates, not just graphics pixels (as in a paint system). This means you may work on a close-in detailed section of

a drawing and modify and update two displays at the same time: the zoom window and the main drawing window.

CAD Concepts

Before anything can be built, it must go through a developmental process called design. Everything (even this book) must be organized into some sort of structure in order for the original concept to function properly.

Years ago, design work was done strictly by hand. If a Ford designer wanted to come up with a new car, he had to use his sliderule, straightedge, and pencil and paper. A writer used his typewriter to build a storyline, and a company Vice President of Operations used a triangle and pen to create an organizational chart of job functions.

Although computers have been around since the late 40's, it wasn't until the 1960's when IBM introduced their 360 line of computers that CAD began to surface. Some designers at Lockheed wanted to automate the design process and began working on a software system for the IBM 360. Soon, Lockheed had created a completely separate subsidiary to continue CAD development. The company was called CADCAM.

Lockhheed, McDonnel-Douglas, and General Motors were the first major CAD users. They used the software for the purpose of developing their own products. No retail or other types of sales were made. Each new software system often went through the same developmental process as each company was afraid of their competitors stealing their code and beating them in creating new products. An ironic twist to early CAD software development is in the process itself. The early CAD designers used pencil and paper to design the operation of the computer software.

In the 70's, the DEC PDP-11 became one of the most popular computer systems available. A commercially available CAD system was released by a design company called Applicon. Within a few years, many companies were developing CAD software. Today, Aegis Draw running with an Amiga represents more power than many full scale mainframe systems of the 60's.

Who Uses CAD?

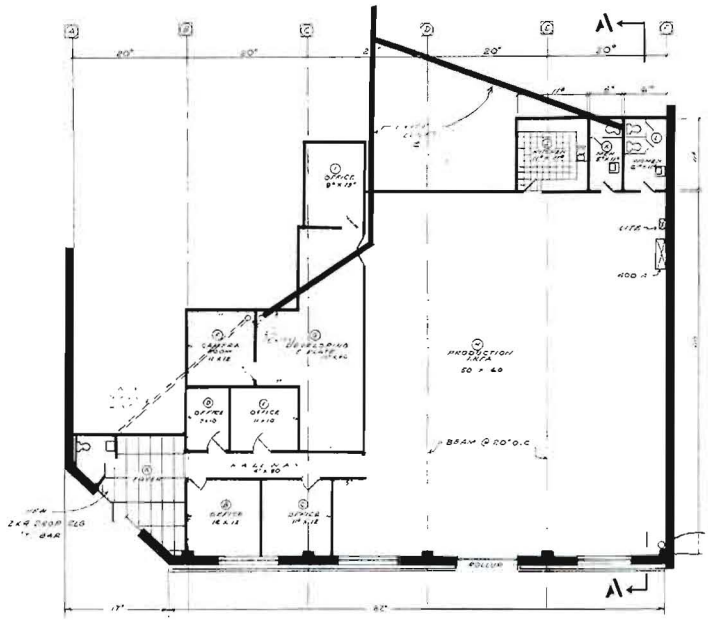
Computer graphics can be used by anyone. Some of the more common users of graphics include electrical and structural engineers, architects, motion picture companies, and students. An electrical engineer can design a circuit board and make changes to his design in seconds. An architect can visually create an entire building using graphics software.

A computer graphics system is of value to others as well. For example, Aegis Draw can be used to create a company's organizational chart.

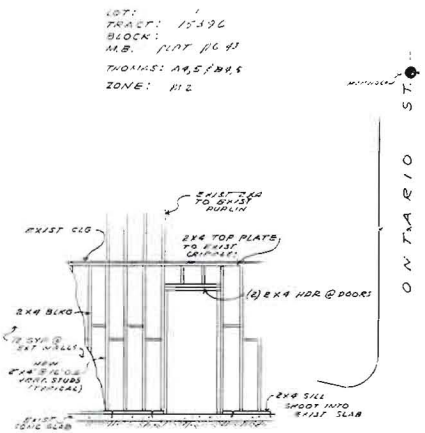
The real value of using a CAD system isn't always in the actual input of information. Sometimes, modifications or additions to a drawing bring out the unique power of a graphics system. Imagine creating a drawing of an electrical plan that shows lighting fixtures. After the plan is complete, you discover you've made an error and each light is three inches too wide. In a manual system, you would be forced to completely redraw the plan. With Aegis Draw or a similar software system, you can adjust the plan and replot it in a matter of minutes.

Computer CAD Requirements

Although CAD software is unique because it is always performed with the use of a computer, not all computers are capable of CAD operations. In order to complete a CAD project, the computer must be able to perform certain tasks. These include the ability to display graphics on a terminal (monitor), redraw those graphics (very quickly) as they



FLOOR PLAN

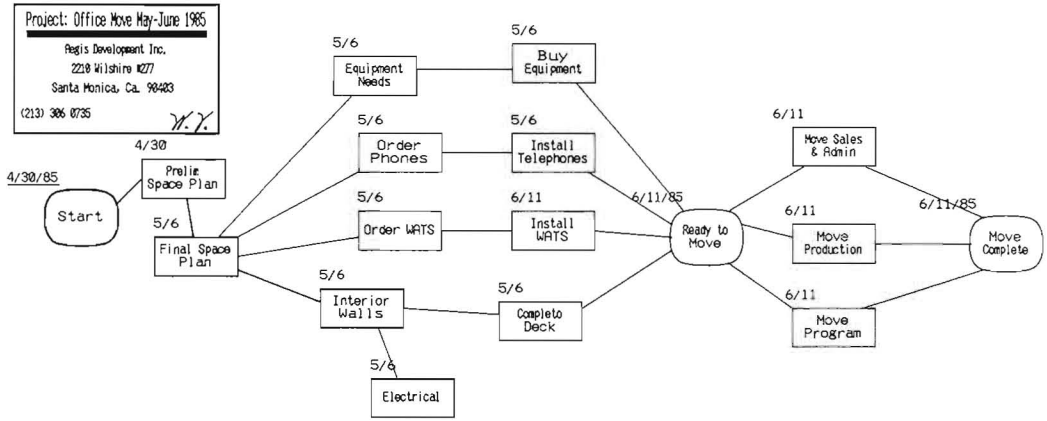


FRAMING DETAIL

NO SCALE

Project: Office Move May-June 1985

Regis Development Inc.
2218 Wilshire #277
Santa Monica, Ca. 90403
(213) 306 0735 W.Y.



are modified, and store enough information so a complete drawing can be rendered. The use of color is not mandatory, but does increase the flexibility of a CAD system.

Along with the internal requirements, a CAD computer system must be able to handle a variety of input and output devices. An input device includes the keyboard, a mouse, digitizer, or lightpen. Output devices include plotters, printers, or video.

The Amiga is more than qualified to handle all of the requirements listed herein. The next chapter discusses the design concepts behind Aegis Draw and how they apply to the Amiga.

CHAPTER

2 An Overview of Aegis Draw

Aegis Draw and the Amiga

The Amiga represents a breakthrough in personal computer graphics. You may have seen animations, games, and paint systems that take advantage of the speed and resolution of Amiga graphics. These advantages also play a role in CAD graphics. On a typical microcomputer CAD system most of the time is spent drawing and filling shapes on the screen. The Amiga has a set of custom chips which speed up the process considerably. You spend more time drawing and less time waiting.

The Amiga's system software also works to the advantage of the Draw program. Multi-tasking allows the Amiga to plot a drawing without making you wait for the plot to finish. This means you can work on an existing drawing and a completely new program at the same time. The multi-window portion of the operating system allows Draw to display several windows of drawings, or even different views of the same drawing. Pull down menus and the mouse provide a powerful interface to the drawing system.

Draw can also output bitmap files in IFF format. This is the format used by most Amiga paint systems (Aegis Images™, Deluxe Paint™,

and Graphicraft™) . It allows you to integrate your drawing system with paint and presentation graphics programs. In the near future word processing software will allow you to insert these bitmaps into text documents.

What is a Drawing?

In order to use Draw to your best advantage, some understanding of what goes on inside the program can be useful. You don't have to know about curve fitting algorithms or scan line conversion to be proficient at Draw, just a basic understanding of the contents of a drawing will do.

When you use a word processor you expect to be allowed to go back to the line you just typed and change the phrase "ant eater" to "arddvark." This is the type of advantage Draw gives you over a paint package. If you use a paint system and want to move a circle to a new location or change its size, you may not be able to. Paint systems can manipulate pixels (dots) on the screen, but they don't "know" that a circle command made those pixels appear. Unlike the word processor which knows what a character, word, and paragraph are, a paint system doesn't have an understanding of the circles, arcs, and lines used to create the painting. The paint system knows about pixels, pixels, and pixels.

Enter Aegis Draw. Draw is like a word processor for graphics. A word processor processes text. Draw processes graphics. For example, if you draw a red circle with a radius of 50 units (more on units in a bit) at a location of x=100, y=100, Draw will store that circle in memory something like this:

A Circle
Radius 50
Center at 100,100
Color Red, filled with pattern 3.

Later if you decide to move the circle, Draw will modify the Center values. The pixels on the screen change (the old circle is erased and a new one drawn in the new position) because Draw redisplays only the portions of the drawing which change. The term for this type of system is "structured drawing". A paint program creates an "unstructured drawing".

In Aegis Draw, the coordinates, radius, and other values are completely independent of the screen. The program uses a High Resolution/Non-Interlaced display of 640 by 200 pixels, but a drawing can have billions of units. The display is only a representation of the drawing; zoom in and you see more detail. In fact, you could draw a picture of the Earth and zoom in to read a piece of paper on someone's desk. This would be impossible for an unstructured system like a paint package.

There are more practical purposes for this resolution. Plotters have quite a bit more resolution than the screen of a computer and they draw smooth lines (no dots). A plotter can be used to create accurate scaled drawings. You may set the size of the drawing to any amount you want, thus allowing you to have drawings that represent real world objects. The size can be changed at any time. This can be useful if you decide you need more room for that office plan than you expected.

The "origin" of the drawing is where it all starts. When you first start the program you will see a 0,0 origin on the rulers in the lower left side of the screen. Draw's origin is always in the lower left of the screen. It is based on the Cartesian coordinate system. If you want your drawing to start at a different origin, say 100,100, Draw will let you. For some drawings you may want to set the origin to a negative value (-100,-100) to give yourself a little working space. This is also allowed in Draw.

A large drawing can get quite cluttered, particularly if it has plumbing, electrical, and other information displayed on top of the basic plan. Draw allows you to break up a drawing into different layers, and to have any number of these layers displayed in any of the windows. Each

object in a drawing sits on a particular layer and each window can show any of the 250 layers in a drawing.

The windows in Draw show a portion of the drawing. Each window can show a different drawing or the same drawing. Windows also have unique background, ruler, and grid colors. It's important to remember when you look at a window that you are only looking at a representation of the drawing.

Uses and Functionality

It's obvious Draw can be used for creating plans of buildings, circuit boards, and mechanical devices. Some other uses of Draw aren't quite as obvious such as organization charts, maps, how-to guides, and technical drawings to name a few.

Basically Draw is useful anytime you need to create an accurate drawing of anything. If you are trying to arrange the space in an office for example, Draw becomes a good tool at "what if" calculations. The dimension lines in Draw are not static, they will recalculate when resized. Often used shapes can be stored in a parts library for future drawings. These parts can be resized and rotated at will. This allows for great flexibility in using Draw as an idea tool.

Aegis Draw's Organizational Layout

The Aegis Draw program is "Tool Based." This is a simple concept akin to drawing by hand. If you were rendering a drawing with a pencil, your tool would be the pencil. Need to erase several things? Just reach over and grab the eraser. Want to draw several circles? Use the "circle tool", typically a protractor.

In Draw these tools appear in a **Tools** menu. The menu is arranged in two columns. The left column is reserved for tools that create. The right column holds tools to modify those creations. If you want to

draw several circles, just select the **Circle** tool. To resize the circles, use the **Sizer** tool.

If all you could create was black and white line drawings, Draw wouldn't be as useful. Luckily Draw allows you to change colors, line patterns, line weight (thickness), fill patterns, and many other options. If you use the **Color** menu and select the color blue, all the shapes you create will be blue until you change the color again. The same is true for line patterns, fill patterns, and several other options and preferences. These settings are not cast in concrete, the **Color** tool will let you change an object's color, pattern, layer, etc., after it has been created.

Sometimes you need to do something other than create or manipulate a single object. Instead you may want to deal with a group of objects or to **Zoom In** on a section of the drawing. In Draw these types of actions are temporary tools. When you are finished with the temporary tool, Draw gives you back your prior one. If you were drawing circles and selected **Erase** from the **Edit** menu, Draw would give you back the **Circle** tool when you finished the **Erase** .

The Draw display is divided into several windows. Windows have certain options which can be changed at will. Background, ruler, and grid colors can be changed on an individual basis for each window in your display. The display (or non display) of rulers and grids is also selectable on a window by window basis.

There are also options affecting the entire Draw program. These include the color menu, line patterns, fill patterns, and line weight. Other options that affect input are **Grid Snap**, **Data Snap**, and **Rounding**. They affect the result of a shape when you use a tool. **Crosshairs On/Off** and **Numeric Display** affect what you see for every window on the screen.

The most important thing to remember about Draw is this:

"The display is ONLY a representation of the Drawing"

Now it's time to make Aegis Draw work for you.

SECTION

2

LEARNING TO USE AEGIS DRAW

CHAPTER

3 Starting Aegis Draw

Loading Aegis Draw, CLI and Workbench

Aegis Draw is shipped with Workbench. You can gain additional memory for drawings by running the program from the CLI (Command Line Interpreter).

To start Aegis Draw from Workbench:

- Turn the Amiga on and boot the computer with the Kickstart disk.
- When the the screen asks for the Workbench disk remove the Kickstart disk and insert the Aegis Draw disk. The Workbench desktop will appear.
- Double click (2 rapid presses of the Selection button) on the Aegis Draw icon. The Draw program will load and you will be presented with the main screen.

To start Aegis Draw from CLI:

- At the CLI prompt enter: **Draw**

An Overview of the Menu System

Almost every action performed by Draw is done through a menu selection. To begin drawing circles, for example, requires selecting a circles option from a menu of shapes. Draw is then ready to draw circles using the mouse.

The main menu system for Draw is located in an area at the top of the screen known as the Menu Bar. When Draw first boots, this area displays the title of the program (Aegis Draw) and the version number you are using.

By pressing the Menu (right) mouse button the bar changes to display the main options of the menu. Placing the cursor on one of these selections while holding the Menu button down will cause the menu options of that category to be displayed in a box beneath it.

By holding the Menu button down and dragging the cursor downward, a highlight bar appears. The bar may be moved up and down through the options. When an option is highlighted and the Menu button released, that option is then selected. In this book we refer to this action as "selecting" or "choosing" an option.

In addition to these menu choices some menu options have sub-menus attached to them. In this case another menu box will open to the right of the option with the various choices available. The cursor must then be moved over into the new box and onto the sub-option desired before the Menu button is released.

To see a sample sub-menu box:

- Hold the Menu (right) mouse button down.
- Move the cursor onto the **Project** menu selection. A box of menu options will open beneath it.

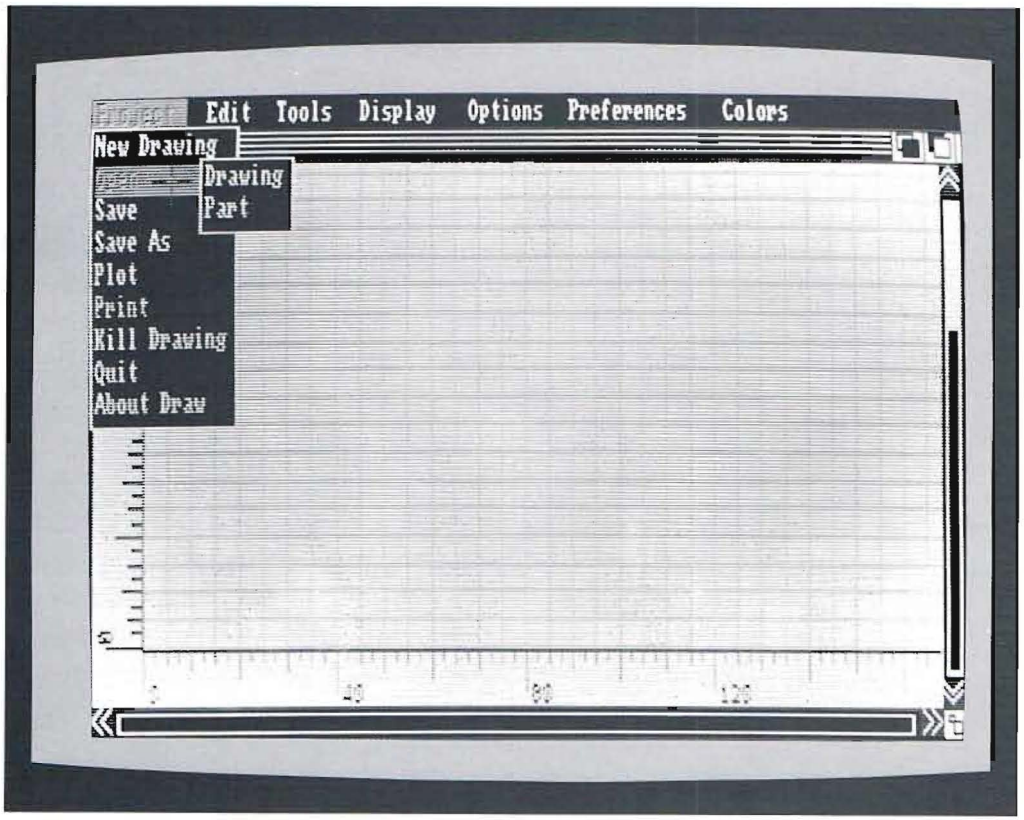


Figure 3.1 The Main Menu Bar. By pressing the Menu button, the title bar changes to reveal the main options of the Draw program. Placing the cursor on an option will open a list of functions beneath it. Some functions may have sub-menu items such as the one displayed. From the **Project** option you may choose to **Open** one of two different types of files. Each menu option breaks the functions of the program into logical areas. The functions under **Project** relate mainly to opening, saving, and printing files. **Edit** commands allow you to manipulate a selected area in different ways. The **Tools** option contains the basic tools for drawing and editing objects. The view of the current window can be adjusted with the **Display** functions, and the way objects are created may be controlled from **Options**. **Preferences** is a list of on/off switches also controlling different aspects of object creation. The last menu, **Colors**, is the color palette.

- Drag the cursor downward until the highlight bar is on the **Open** option. A sub-menu box will open to the right displaying the different kinds of files you can open.

The main menu options appearing in the Menu Bar are: **Project, Edit, Tools, Display, Options, Preferences, and Colors.**

Project

The options under this selection are for creating new drawings, opening and saving drawings, clearing drawings from internal memory, and printing or plotting. The option for leaving Aegis Draw is also here.

Edit

The editing functions listed here are for making changes to an area of a drawing. You can cut, copy, and paste segments of a drawing similar to the way you might cut and paste in a word processor. There are also commands for distorting and rotating areas, or changing the size, color, line pattern or line weight of all the objects in an area. You can group objects together to create parts which may be plugged into different areas of the drawing or even into other drawings. The "oops I goofed" function is also found here. It's called **Undo** and it removes the last action performed and returns the drawing to its previous state.

Tools

This is really the heart of the Draw system. All the main tools for creating the shapes in a drawing are located here. Lines, circles, rectangles, arcs, text, freehand shapes, and dimension lines are all chosen as options off this menu. There are also tools for manipulating the shapes once they have been created. You can move, copy, rotate, erase, resize, and change the characteristics of any object.

Display

All the commands under **Display** control the view of the drawing in the active window. You can turn the grid and rulers on or off, and change their color or the color of the background. A crosshair for precision alignment is also available. The level of detail displayed can be adjusted from a full view of the drawing to a blow up of a small region. The command for choosing which layers will be displayed in a window is also under this menu selection.

Options

The **Options** menu allows you to control different aspects of the drawing such as the thickness and pattern of lines used to create shapes, or the fill pattern used for solid shapes. Other aspects controlled here include the grid size and line pattern, the type of units used with rulers, the level of precision, plotter scale, and the size and origin of the drawing.

Preferences

Options located under this menu selection are all on/off switches. Like **Options**, they control different aspects of the shapes and how they are drawn. You can specify whether shapes will be filled or outline, and which layer is currently active so all shapes created will be assigned to it. The numeric display of the cursor location, grid snap, data snap, rounding, and smoothing are all controlled from here as well.

Colors

The last selection is the color palette. This is where you choose the active color to work with. There is also an option for changing the hue of the colors in the palette.

Menu Shortcuts

If you have several choices to make in the menus you can make them all at once without having to wait for each job to finish. For example, to set the background to black and the rulers to red requires selecting first black from the **Color** menu, then **Set-Background** from the **Display** menu, then red from the **Color** menu, and finally **Set-Rulers** from the **Display** menu. If you take each job one step at a time (pull down each menu and release it), you must wait for the screen to repaint with a black background before you select the red rulers and then wait for the screen to repaint again.

A faster way to perform these operations is provided by the Amiga system. You may perform all the menu selections at once by holding the Menu button down continuously and pressing the Selection button any time the highlight bar is on the command of your choice. Using this method the steps above would look like this:

- Hold down Menu button. Move the cursor to the **Color** menu.
- Move the highlight bar to black and press the Selection button.
- With the Menu button still down move the cursor to the **Display** menu and drag the cursor until it is over **Set**. A sub-menu box will open to the right with the available options.
- Move the cursor until the highlight bar is on **Background** and press the Selection button.
- With the Menu button still down move back to the **Color** menu and follow the above steps to set the rulers to red.
- Once you have made all your choices with the Selection button, release the Menu button and all the actions will be performed in the order of their selection.

Using the Mouse

Almost every function in Draw is initiated or performed with the mouse. The two buttons on the mouse always perform the same action with any function. Use the Selection (right) button to choose or create objects and the Menu (left) button to work the menus or cancel the current action. So whether you are creating circles or selecting an area of the drawing to erase, the Selection button performs the action and the Menu button cancels it.

Most tasks in Draw are two step tasks. They require a press of the Selection button to begin (the start of a shape or to choose the object to change), a movement of the mouse to enact the task and another press of the Selection button to end. During the task a "rubberband" line displays the changes being made and reflects the movement of the mouse. When the rubberband line is correct for the change being made, the last press of the Selection button is performed to conclude the task. Anytime between the two Selection button steps the Menu button may be pressed to cancel the operation.

Some operations like finishing a line require a double click of the mouse. Double clicking means pressing the Selection button twice in rapid succession.

Besides manipulating the menus and shapes in a drawing, the mouse is used for controlling the windows and moving them about on the desktop. Moving windows is done by dragging. Dragging requires placing the cursor on the object to drag (in this case the window frame) and holding the Selection button down while moving the cursor to a new location on the screen. Scroll bars are other gadgets that use dragging.

Alternative devices to the mouse may be used with Draw and details about them can be found in Chapter 19.

Using the Amiga Gadgets

Draw makes extensive use of the Amiga interface to simplify the CAD process. Besides menus and windows the program also uses buttons, sliders, and edit boxes. (If you are already familiar with these Amiga functions you may want to skip ahead and briefly scan the material on edit boxes. There is a complete list of edit commands.)

Buttons

Buttons are devices for performing a single action or for making a choice (yes/no for instance). They typically appear in requestors and are used to exit the requestor with a particular action occurring. For instance if you choose the command **Kill Drawing** a requestor appears confirming the operation with the question: **Kill the Drawing?**. At the bottom of the requestor are two boxes, one with the word **Yes** and the other **No**. They are the buttons for exiting this requestor. You answer the request by clicking on one of these buttons.

Sliders

Sliders control a value that has a range. For example, the **Modify Colors** requestor has sliders for controlling the amount of Red, Green, and Blue in a color. A slider appears on the screen as a rectangle (which represents the range) and a marker (representing the current value). You operate a slider by dragging the marker (place cursor on marker, hold Selection button down, and move mouse) to a new position.

Edit Boxes

Edit boxes are used for entering values to Draw. They appear in requestors as rectangles. They may already hold a value (the last text entered or the current value) or appear empty. To use an edit box you must first select it by clicking inside it. When a cursor appears inside the box it is ready for use.

The edit box uses an "insert text" method rather than "type over". This means any text you enter will be inserted in any existing text at the cursor position. If text already exists in the box you will have to delete it first before entering text to replace it. To do this, move to the end of the current text and backspace over it or use the DEL key to delete the text one character at a time. Below is a list of command keys allowed in the edit boxes.

Keys(s)	**Function**
(left arrow) or (right arrow)	Move the cursor one character in the desired direction.
SHIFT (l arrow) or (r arrow)	Move the cursor to the beginning or end of all text.
DEL	Delete the character under the cursor.
Backspace	Delete the character to the left of the cursor.
RETURN	Finished with the text. In the case of a single edit box it will also have the effect of selecting the **OK** button.
Right Amiga - Q	Undo (cancel) the last editing change.

CHAPTER

4 Learning Graphics Primitives

This chapter is a step by step tutorial on the basic tools found in Aegis Draw. Chapter 5 continues the tutorial with a tour of the editing features and some of the more advanced tools. Chapter 6 finishes the step by step tutorial.

When Draw first loads, an initial window with the title "Untitled" is displayed. This is the current active window. You may load drawings into this window from disk or create a new drawing.

The left and bottom borders of the window contain the rulers. Rulers provide a means of accuracy for both creating and placing objects. Initially the rulers are preset to 140 units by 150 units.

First, resize the window to full screen to provide a larger working area.

To resize the window:

- Place the cursor on the resize box of the window. This is the gadget in the bottom right corner where the window borders come together.

- Hold the Selection (left) button down and drag the cursor to the bottom right corner of the screen. A ghost frame will appear around the window. As you move the cursor you will notice the frame follows it.

- When the frame extends to the bottom and far right of the screen release the Selection button. The window will be redrawn to the new size. You may resize any window in this manner.

Every drawing is just a collection of shapes combined together to make a whole. The tools to make these shapes are under the **Tools** menu. Hold the Menu (right) button down. The third menu option from the left is the **Tools** menu. Move the cursor until it is over **Tools**. The different tools available will appear under the option. The selections on the left are for creating objects and those on the right are for editing or manipulating them.

One of these tools is always selected. The default tool is **Lines**. This means the mouse is ready to create lines. Now try it.

Draw a square with the Line option:

- First, select a color to work in. Pull down the **Color** menu and move the highlight bar until a dark color is chosen (shows up better on the white background) and release the Menu button.

- Pull down the **Tools** menu and be sure **Lines** has a check mark next to it. If it doesn't, hold the Menu button down and move the cursor until the highlight bar is on **Lines** and release the button.

- Place the cursor near the center of the screen and press the Selection button. If you make a mistake at any point press the Menu (right) button to abort and start over.

- Move the cursor. Notice a ghost line appears between the selection point and the current position of the cursor. This shows you where

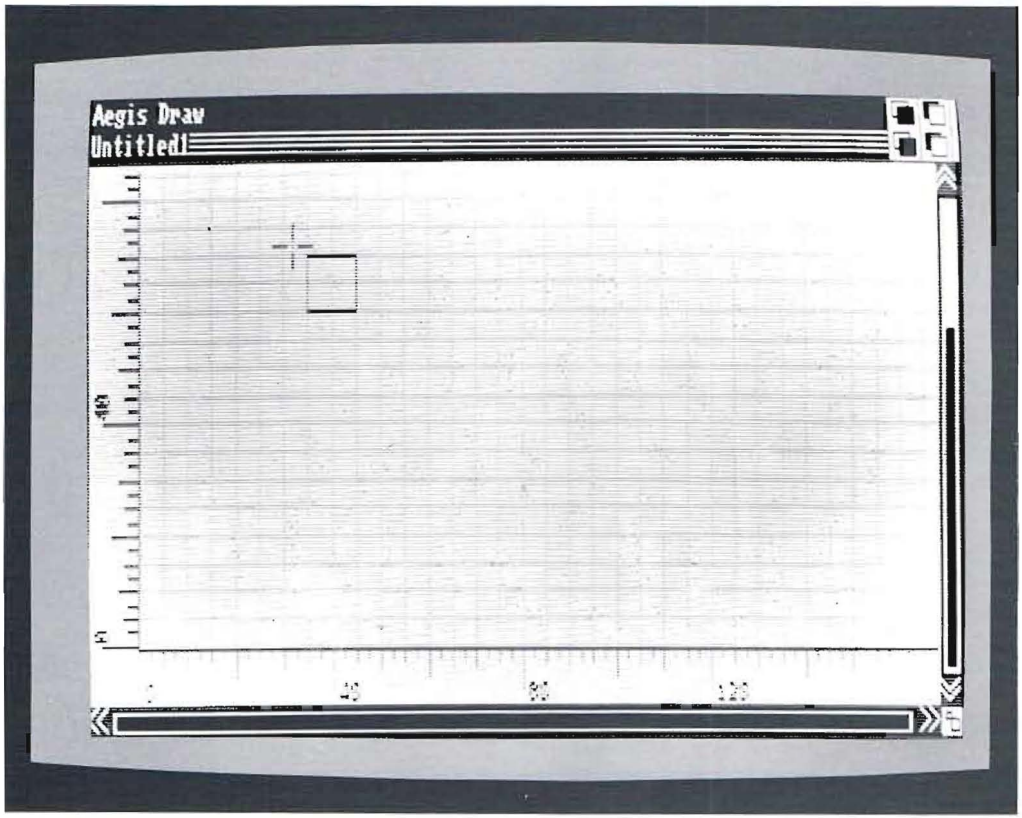


Figure 4.1 Using the Line Tool. Line *uses a "give one" method of creating lines. The end point of a line becomes the beginning of the next line until you double click to end the sequence. In the example, making a square is done by clicking again until all four corners are defined. The square is then closed with the last line and a double click is issued when the starting point is reached.*

the line will be when you complete the operation. You may also note the line seems to snap to intersections of the grid. This is because **Grid Snap** is turned on (more on this later).

- Pull the cursor 2 grid lines down and press the Selection button.

- Move the cursor again. The rubberband line now extends from the second point. This is known as a "give one" method of creating lines. The ending point for the last line created becomes the beginning point for the next line.

- Move the cursor 2 grid lines to the right and press the Selection button.

- Move up 2 grid lines and press again.

- Close the square by moving the cursor back to the starting point. To end the line making process press the Selection button twice in rapid succession (double click). There should now be a 2 X 2 square in the color you selected on the screen.

Lines are a principle tool in creating drawings, but some of the other tools can be used to perform functions similar to the one above. For example, **Rectangles** and **Polygons** can both create the square shape easier than **Lines**.

Drawing a square with Rectangle:

- Select **Rectangle** from the **Tools** menu.

- Move the cursor near the first square and press the Selection button.

- Move the cursor down and to the right. A ghost frame will appear showing the rectangle.

- When the frame is a 2 X 2 square press the Selection button. A square like the first will appear.

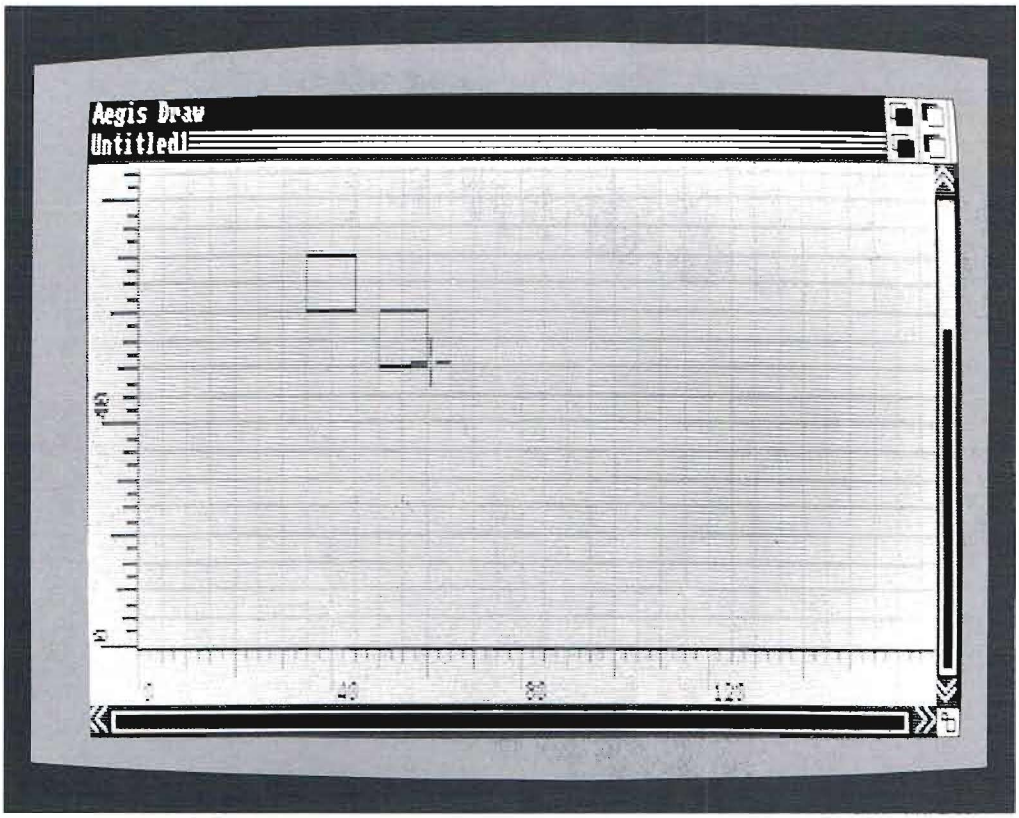


Figure 4.2 Using the Rectangle Tool. *A square like the one made above can be made easier with* **Rectangle**. *To use the tool, first select it from the* **Tools** *menu. Place the cursor on the first corner and click. Now drag the cursor to the opposite corner. A ghost square appears showing what the object will look like when the operation is complete. When the square is a 2 x 2 click the Selection button again.*

The **Polygon** command is similar to **Rectangle**. It lets you create multi-sided shapes quickly. After the first two points are chosen, two rubberband lines are attached to the two end points. you create the polygon by "stretching" these lines into the shape you want.

If you follow this tutorial step by step the end result will be a basic office layout. The next step details using the **Polygon** function to create a desk with a return (an L shape).

Create an L shape with Polygon:

- Select **Polygon** from the **Tools** menu.
- Place the cursor near the center but give yourself room to make the shape. Press the Selection button.
- Move the cursor down 2 grid lines and press the Selection button.
- Move the cursor to the right 4 grid lines and press the Selection button again. The polygon will begin to take shape. Notice the **Polygon** command creates an object that is already closed and you simply pull it into shape.
- Move the cursor down 4 lines and press the Selection button.
- Move to the right 3 lines, click, and then up 6 lines and double click (2 rapid presses of the Selection button) to end the shape. If you pressed once to many times a new polygon may be started from the point. Press the Menu button to cancel it.

The lines used to build shapes can be made in a variety of ways. The thickness (weight) and pattern can be adjusted for each object created. Those already created can be changed to other weights and patterns. There are 3 weights for lines (single, double, and triple width) and 7 patterns ranging from solid to dotted.

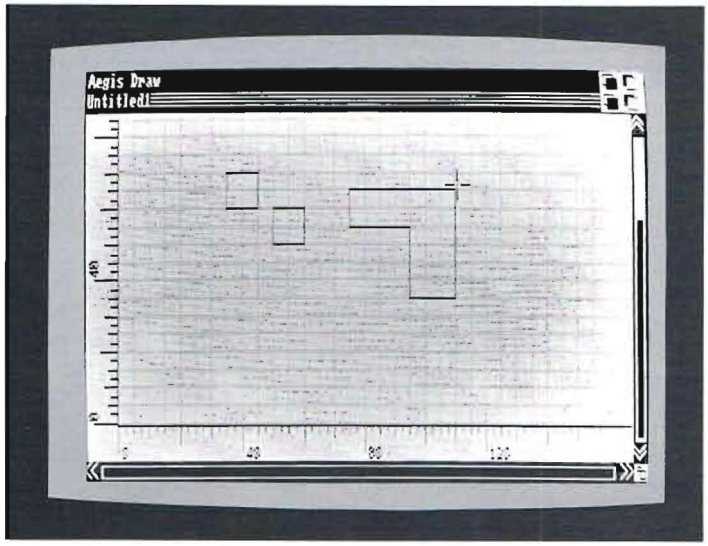


Figure 4.3 Using the Polygon Tool. *Odd shapes can be made either with the* **Line** *tool as detailed earlier or with* **Polygon**. *A polygon is a closed object you pull into the shape you want. In the example an L shape is created by moving to each point, clicking on it, and moving to the next point. The sequence is finished by double clicking on the last point. Notice that with* **Polygon** *the last line is already drawn for you.*

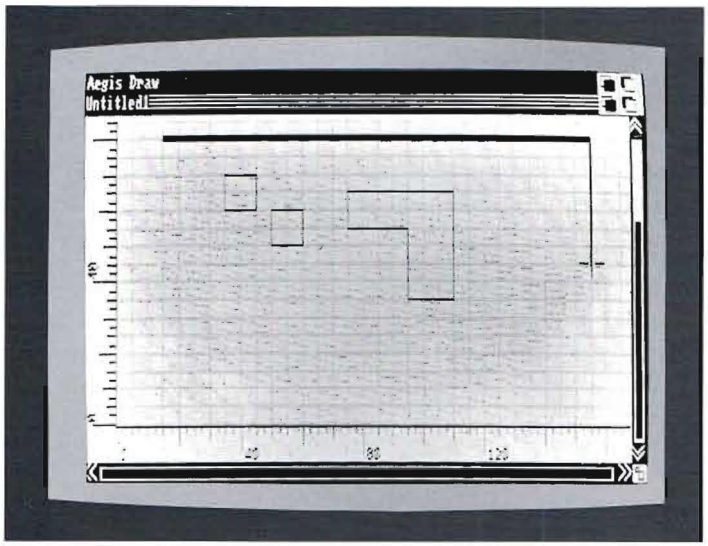


Figure 4.4 Creating the Walls. *The walls in the drawing are made with a thicker line. To change the thickness of the line select* **Line Weight** *from the* **Opions** *menu and choose the triple line weight from the submenu. With the* **Line** *tool draw two mirrored L shapes as above. Notice the horizontal lines are thicker than the vertical ones. This is because there are more horizontal pixels so vertical lines appear squeezed. On a plotter both lines are the same thickness.*

In the tutorial it's time to create some walls for the office layout. A typical diagram would show the walls with a thicker line than the one used to create things like desks.

To adjust the line weight and draw some walls:

- Select **Line Weight** from the **Options** menu. A sub-menu box will open to the right displaying the 3 different line weights.
- Move the cursor until it is on the thickest line (triple weight) and release the button.
- Select **Line** from the **Tools** menu.
- Move the cursor to the upper left corner of the window and choose a starting point for the wall.
- Move to the upper right corner and click again.
- Move down halfway and double click to end the wall.
- Now move down 3 grid lines to leave space for a door and start another wall like the one above (down to the lower right corner and back to the left to end on the same line).
- Now draw 2 short lines, one from each end wall on the left. Leave a gap between them of about 8 grid lines. This will be a window.

Changing the line pattern and drawing a window:

- Select **Line Pattern** from the **Options** menu. A sub-menu box will open to the right displaying the different line patterns.

- Move the cursor until the dotted line pattern is highlighted and release the Menu button.

- Select **Line Weight** from the **Options** menu. A sub-menu box will open to the right.

- Choose the single line weight.

- Now draw a line across the gap at the end of the office. Presto! An office with a window, a desk, 2 filing cabinets, and no door.

  Some of the other shapes which can be made in Draw include arcs and circles. Arcs are made by first choosing the center point and then defining the radius. From these two points Draw will create a 360 degree arc that is shortened by moving the mouse to get the arc you want. In the example an arc can be used to show the clearance needed for a door.

Making an arc and a door:

- Select **Line Pattern** from the **Options** menu and choose the solid line again.
- Now move to the point of the bottom door opening on the right and press the Selection button.
- Moving at a 45 degree angle from the wall draw a line 2 grid squares across and double click to finish the line. You should now have a door standing open.
- Select **Line Pattern** from the **Options** menu and choose the dotted line.
- Select **Arc** from the **Tools** menu.
- Place the cursor on the same point where you started the door and press the Selection button.
- Move straight up to meet the other wall and press the Selection button again. A ghost circle will appear with its center at the first point.
- Now move the cursor to the left. The circle will shrink to just the arc forming between the second selection point and the cursor.
- Move the cursor until it reaches the door and press the Selection button.

All of the steps so far have been using the left side of the **Tools** menu. The right side of the menu lets you change or manipulate the objects on the left. For example the two squares created earlier are going to be filing cabinets. Right now they're sitting in the middle of the office. They need to be moved, say to the front against the wall.

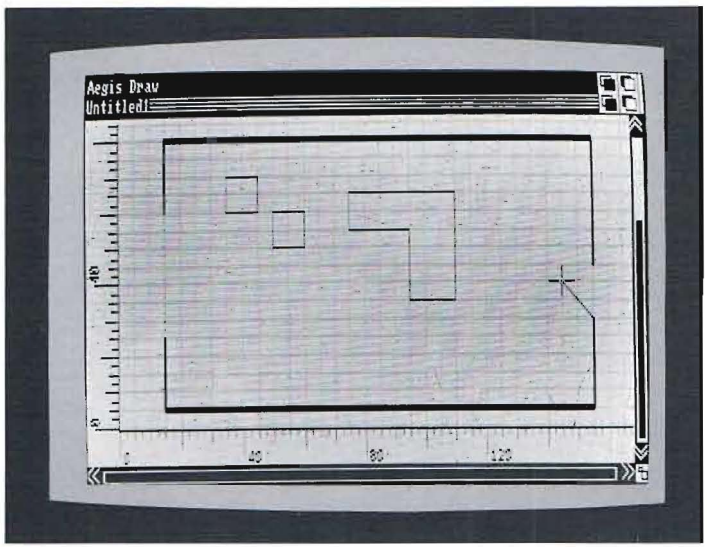


Figure 4.5 Making a Door. *Adding the door to the example is an easy step. The line pattern is set to solid and the* **Tools** *option is* **Line**. *First the bottom door jam is chosen. Next a line is drawn at a 45 degree angle into the office 2 grid lines long. Notice the dotted line pattern used for the window. There are 7 different line patterns in Aegis Draw.*

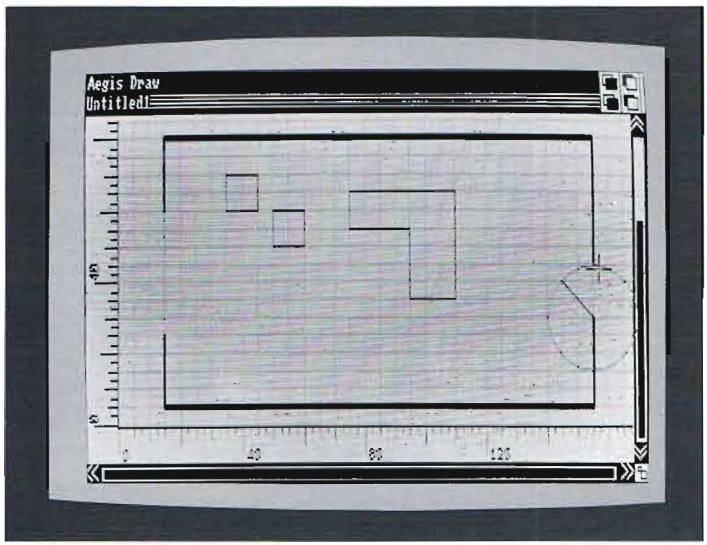


Figure 4.6 Using the Arc Tool. *The arc in the example is used for displaying the swing of the door. It is created by choosing a dotted line pattern and the* **Arc** *command from the* **Tools** *menu. The bottom door jam is used for the first point. This is the center of a circle from which the arc will be cut. The cursor is then moved to the opposite door jam and that point chosen. This defines the radius of the circle. Last the cursor is moved to the left until it reaches the door. This is the last point. A ghost arc appears showing what the shape will look like when it is complete.*

To move an object:

- Select **Drag It** from the **Tools** menu. This works like any other tool. Until you change to another tool you are going to move any object you select.

- Place the cursor on the border line of one of the squares. To select an object in Draw, always place the cursor on one of the border lines of the object. Clicking in the center of the square will have no effect since Draw only sees the object as four lines not as a square.

- The square will appear highlighted when selected. Now move the cursor. The highlight frame of the square will follow it.

- Place the frame near the front of the office. When it is in the right position press the Selection button to put the object down. The square will be erased and redrawn in the new position.

- Move the other square near the first.

One of the other tools that's very handy is **Clone**. This lets you make copies of objects with just one command. For the example, another desk would be nice.

To make a copy of an object:

- Select **Clone** from the **Tools** menu.

- Place the cursor on a line of the desk shape and press the Selection button. A frame appears around the desk when it is selected.

- Move the cursor to one side. The frame will follow the cursor.

- When the frame is clear of the first desk press the Selection button again. A second desk will be drawn inside the frame area.

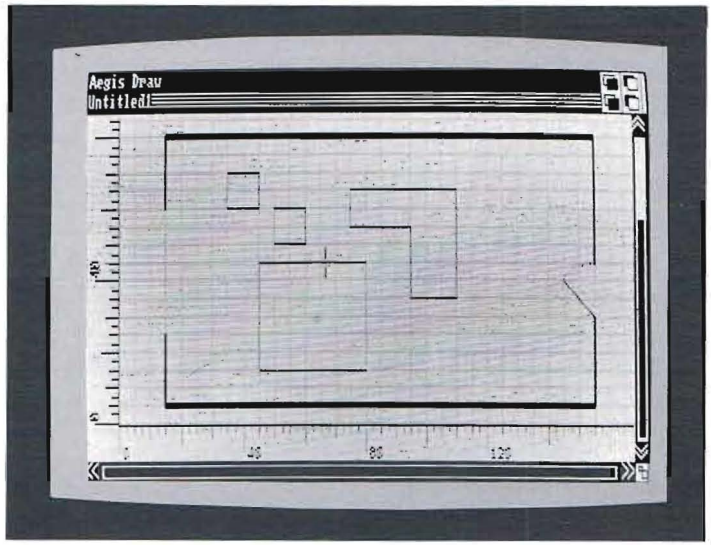


Figure 4.7 Using the Clone Tool. Clone creates copies of objects and allows you to move them about the drawing. A copy of the L shape is used to demonstrate this. The object is selected by choosing one of its borders. Placing the cursor inside the object will not work as Aegis Draw can only recognize an object when the cursor is on the border. A frame will appear around the object when it is selected. The cursor is moved (the frame follows it) to the location for the copy and the Selection button is pressed again to end the operation.

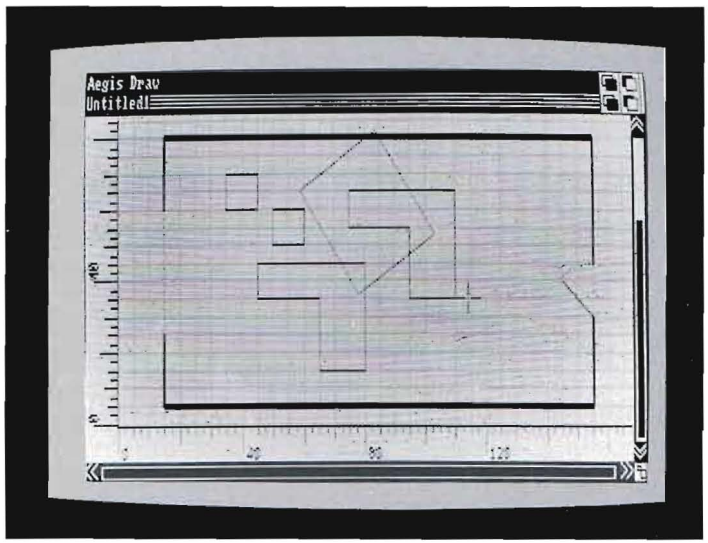


Figure 4.8 Using the Rotater Tool. Rotate allows you to adjust the angle of objects as they appear in a drawing. As an example of this the object just created with **Clone** is rotated. To rotate an object, first select it (a frame appears when it is selected), then move the cursor to get the right alignment. The frame will respond to the movements of the cursor. When the frame shows the right alignment press the Selection button.

One more feature and we'll call this part of the tutorial complete. Another useful way to manipulate objects is to spin or rotate them. The **Rotater** tool provides this function. In the office diagram one of the desks needs to be rotated and both moved.

To rotate an object:

- Select **Rotater** from the **Tools** menu.
- Place the cursor on a line of one of the desks and press the Selection button. A frame appears around the desk when it is selected.
- Move the cursor to one side. The frame will spin on its axis as you move the cursor. Moving the cursor further away from the frame will give you more control of the rotation.
- Rotate the frame 90 degrees from its original position and press the Selection button. The desk will be erased and redrawn in the new position.
- Now use the **Drag** tool to move the desks into spots near the front of the office.

If you want to continue this tutorial in the following chapters now would be a good time to save the drawing in case you need to quit at some point. This way you can come back to it to finish.

To save the drawing:

- Select **Save As** from the **Project** menu. A sub-menu box will open to the right displaying the different file types.
- Move the cursor until **Drawing** is highlighted and release the Menu button. The storage requestor will be displayed.
- Click in the edit box labeled **File**. Type in the name of the drawing.

- When the name is correct select the **OK** button. The file will be saved in the Drawing directory under the name you gave it.

To load the file back in:

- Select **Open** from the **Project** menu. The storage requestor will be displayed.
- The name of the file should be listed in the scrolling window in the center of the requestor.
- Place the cursor on the name and press the Selection button. The name will be loaded into the **File** edit box.
- When the name is correct select the **OK** button. The drawing will be loaded into the active window.

CHAPTER

5 Editing

The features under the **Edit** menu are similar to the edit functions on the right side of the **Tools** menu. The difference is the **Edit** commands work on all the objects in an area. So performing a rotation for example changes everything in the selected area at the same time.

The three main commands under the menu are **Cut**, **Copy**, and **Paste**. These commands allow you to use an area of memory known as the clipboard to change the drawing. When one of these functions is performed all of the objects in the area are moved to or from the clipboard. A **Cut** command will erase all of the objects in the selected area and move them to the clipboard. A **Paste** command can then be used to move them from the clipboard to any point in the drawing or even to another drawing or window. The **Copy** command performs like **Cut** except the objects are not removed from the drawing, they are only copied into the clipboard.

In the example the two filing cabinets will be moved as a unit.

- Select **Cut** from the **Edit** menu.

- Place the cursor a full grid line above and to the left of one of the cabinets and press the Selection button.

- Move the cursor 1 grid line below and to the right of the other cabinet. A selection frame will appear around the squares. Be sure the frame encloses both cabinets.

- Press the Selection button. The squares will be erased from the screen.

- Select **Paste** from the **Edit** menu. A frame will be attached to the cursor. This is the contents of the clipboard.

- Move the frame to the back of the office and press the Selection button. The squares will be redrawn.

- Now choose **Paste** again from the **Edit** menu. The frame will reappear. The contents of the clipboard is still there. It will not be changed until another **Cut** or **Copy** command is performed. Press the Selection button again so you have 4 squares altogether.

  In addition to these commands is another handy function, the eraser (detailed in Chapter 10). The eraser uses the same selection frame process. Once an area has been chosen all the objects entirely inside the frame will be removed from the drawing. Commands like this raise a problem. What happens if you make a mistake. The **Undo** command is there for the inevitable slip. Most of the commands in Draw can be undone once they are performed. The command option in the menu is shaded anytime it cannot be used or there is nothing to **Undo**.

  Try an **Undo**.

To Undo an action:

- Select **Paste** from the **Edit** menu. This will be the action to remove.

- Paste the object on the drawing.

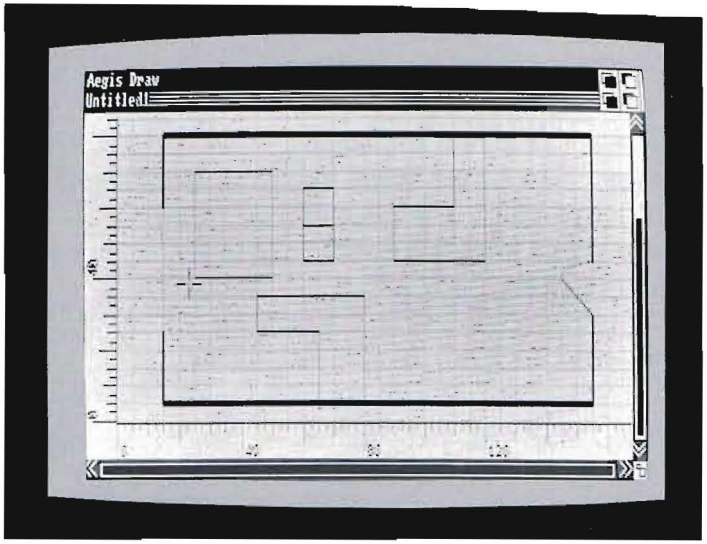


Figure 5.1 Using Cut and Paste. The functions under **Edit** menu perform actions similar to the editing tools but they work on all of the objects in a selected area. The **Cut, Copy,** and **Paste** functions use an area known as the clipboard. A **Cut** command will remove the objects in an area and store them there. **Copy** places a copy of the objects in the clipboard while **Paste** is used to move the contents of the clipboard into a drawing. Areas may be moved from one drawing to another this way.

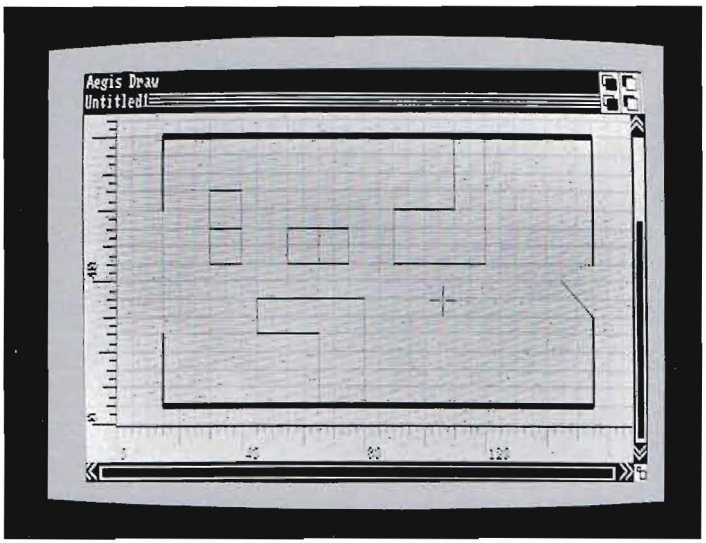


Figure 5.2 Using Rotate. The **Rotate** function is like the **Rotater** command under the **Tools** menu. Instead of working with only one object though it adjusts all of the objects in a chosen area. In the example the filing cabinets are rotated together.

Now select **Undo** from the **Edit** menu. The drawing will be redrawn with the last paste action removed.

Now it's time to rearrange the filing cabinets that have been moved to the back of the office. Under the **Modify** command are a series of sub-functions you can use to do this. To move the cabinets from the middle of the floor they need to be turned sideways and moved against the wall.

To rotate all the objects in an area:

- Select **Modify** from the **Edit** menu. A sub-menu box will open to the right showing the different **Modify** commands.
- Move the cursor until the **Rotate** command is highlighted and release the Menu button.
- The command works like the other **Edit** commands now. Move the cursor to an area above and to one side of the cabinets and press the Selection button.
- Move the cursor to the opposite corner completely enclosing both cabinets and press the Selection button.

Now the function works in the same manner as the **Rotater** under **Tools**. Move the frame until the shapes are rotated 90 degrees and press the Selection button.

Once both sets of cabinets have been rotated, move them flush with the wall. Obviously this same task could have been performed a number of ways. Because the shapes were so simple, the **Drag It** command could have been used to move them one at a time against the wall, but when an area is filled with shapes or it needs a slight angling the **Modify** command is perfect.

Zoom and Zoom Windows

The **Zoom** option is one of the more powerful capabilities of Draw. It lets you move into your drawing to an almost infinite level. It is not like a "Fat-Bits" operation in a paint package where the pixels get big so you can see them better. The pixels always stay the same size but objects get bigger as you zoom in on them.

In the example the filing cabinets could use some names. Time to zoom in on them and add some text.

Using Zoom and Text:

- Select **Zoom** from the **Display** menu. A sub-menu box will open to the right showing the different options.
- Move the cursor until **In** is highlighted and release the Menu button.
- Place the cursor above and to the left of the filing cabinets and press the Selection button.
- Move the cursor to the opposite corner. A ghost frame will appear showing the area to zoom in on. This will be the display in the window when the operation is complete.
- When the frame is correct press the Selection button again. The screen will be redrawn at the new level. Notice the rulers and grid have changed to reflect the new level of display.

Now to put a name on each of the cabinets. The **Text** command is one of the **Tools**. When you activate it, a requestor is displayed. In the requestor is an edit box for the text you will use.

To add text:

- Select **Text** from the **Tools** menu. A requestor is displayed.
- Click inside the edit box with the Selection button.
- Enter the text "File A" with the keyboard.
- When the text is correct press RETURN or select the **Label** button on the requestor.
- Move the cursor until it is 1 grid line from the inside left of the left most cabinet and press the Selection button.

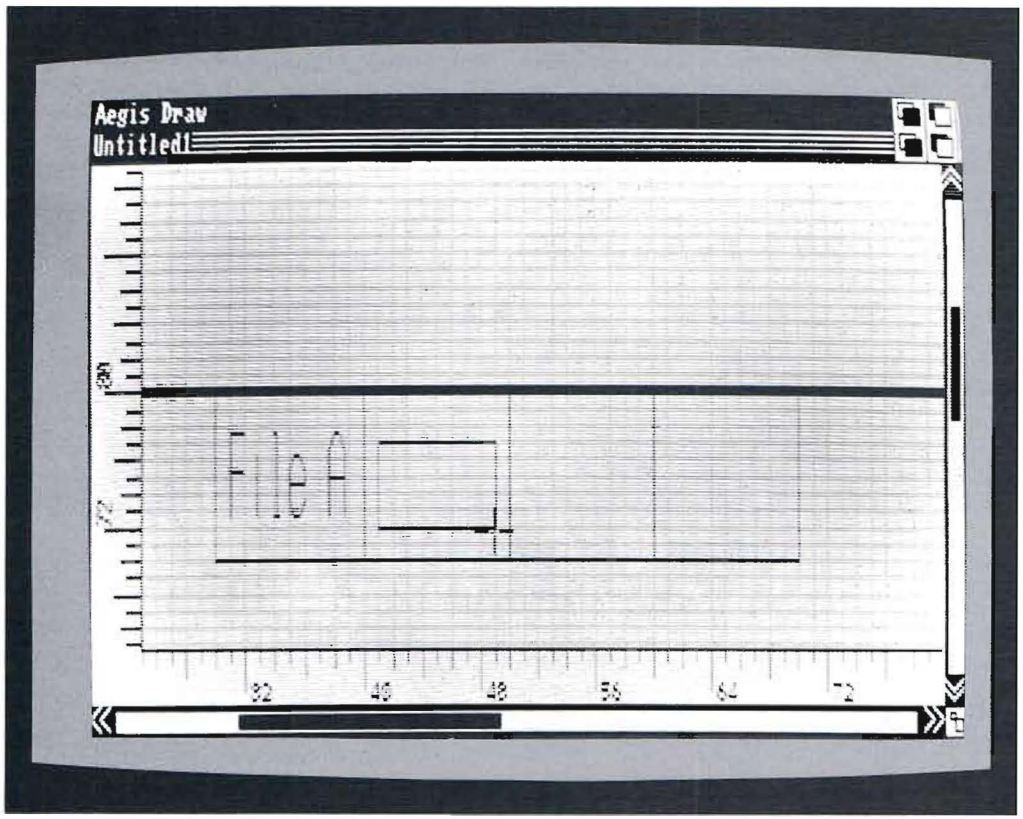


Figure 5.3 Using Zoom and Text. *To perform the next step in the tutorial, two different functions are used. The first,* **Zoom**, *is a magnify feature which allows you to work in increasing levels of detail. To* **Zoom In** *you select the command from the* **Display** *menu and then define the area similar to the way you choose an area for editing. The view in the window is changed to magnify the area. Zooming in on the part of the office with the filing cabinets allows you to work on them in detail. The next step is to label them with text. The* **Text** *function uses a special type of font which allows you to size or distort the label with great flexibility and still maintain a high level of clarity. A text label is like any other object. It may be moved, rotated, resized, or edited. Once the text labels are added to the cabinets the regular display may be returned with the* **Full Display** *command.*

- The command works similar to the **Rectangle** tool. Move the cursor to the opposite corner to make a rectangle. The text will be printed inside this space. The frame can be made to any height and width to distort the text as you need. In this case move the cursor 1 grid line from the inside right of the cabinet and 4 grid lines down.

- Press the Selection button. The text will be printed in the space.

- Now select **Text** again. The requestor will be presented.

- Click inside the edit box to activate it. Use the backspace key to delete the "A" and replace it with "B".

- Press RETURN or use the **Label** button to exit the requestor.

- Label the next cabinet. Repeat the process to name each cabinet with successive letters.

- Once all of the cabinets are labeled select **Full Display** from the **Display** menu to return to the original view.

CHAPTER

6 Advanced CAD Operations

A great feature of Draw is the ability to create parts. A part is a collection of shapes grouped together to form a single unit. This means once the individual objects are a part the commands under the **Tools** menu can be used to manipulate them.

In the example, a water cooler can be used to demonstrate making a part. First, make the cooler.

Making a water cooler:

- Select **Zoom** and then **In** from the **Display** menu.
- Choose an area that is 4 grid lines high and 6 wide.
- Select **Rectangle** from the **Tools** menu.
- Select a solid line pattern from **Line Pattern** under the **Options** menu.
- Draw a 6 by 6 grid line square near the center of the screen.
- Select **Circle** from the **Tools** menu.

- Place the cursor in the center of the square you just created and press the Selection button.

- Move the cursor toward a line of the square. A ghost circle will appear. This will be the water tank of the cooler.

- When the circle almost touches the lines of the square press the Selection button.

- Choose **Text** from the **Tools** menu. The text requestor will appear.

- Enter "WC" for water cooler in the edit box and press RETURN or use the **Label** button when complete.

- Place the text inside the circle.

- Choose **Full Display** from the **Display** menu. You should now have a water cooler that is a little larger than one grid square in your full display drawing.

Now to make the separate objects into a single unit.

To create a part:

- Choose **Group** from the **Edit** menu. This command works like the other functions under the **Edit** menu. You create a frame around the objects you want to group together.

- Place the cursor above and to the left of the water cooler and press the Selection button.

- Move the cursor below and to the right of the water cooler and press the Selection button again. The part requestor will appear. Notice the last text you entered (WC) is in the edit box.

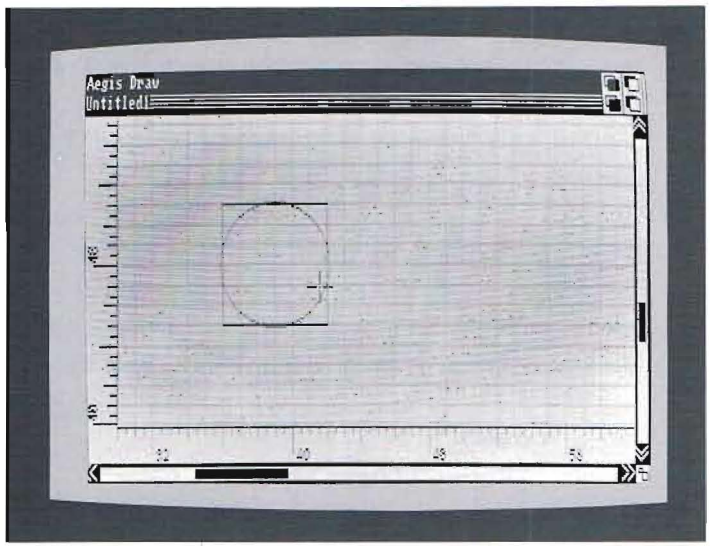


Figure 6.1 Making a Water Cooler. Three objects are brought together to make a water cooler. The first is a 6 x 6 grid line square which represents the base of the cooler. The next object added is a circle with its center located in the middle of the square. This is the water tank of the cooler. Last a label of "WC" (water cooler) is added as an identifier.

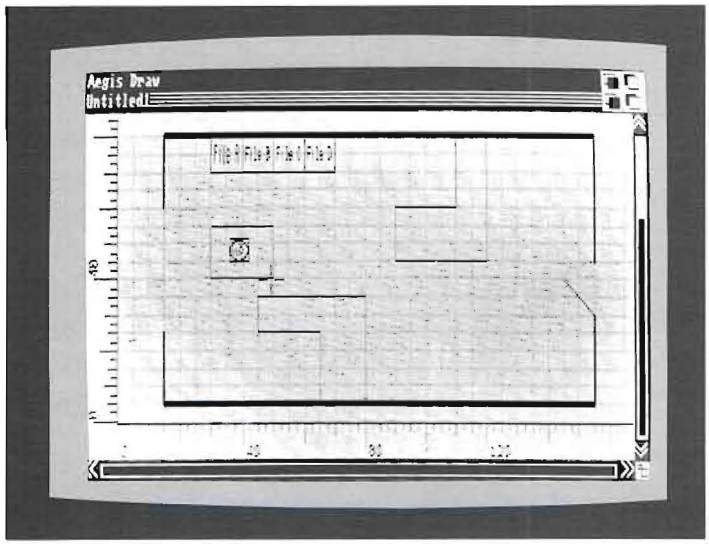


Figure 6.2 Making a Part. The three objects used to create a water cooler can be grouped together to create a part. The advantage of making parts is twofold. First, it saves memory if you are going to use the part repeatedly, and second it saves time because a single mouse action will create the entire part. To make a part, select the **Group** function from the **Edit** menu and select the area with a frame.

- The name you want to give to the part should be entered in the edit box. Since "WC" is a good abbreviation for a water cooler choose the **Name** button to accept it as the name for the part. The name and the part have now been entered into the "In Stock" list for this drawing.

  Now that the part has been created it can be edited and changed like any other object. This is how to create symbols for any object you use a lot in your drawings. Not only can the object be manipulated like any other object but it can be created like one as well.

Using a part:

- Select **Part** from the **Tools** menu. The part requestor will appear with a list of available parts. In this case there is only one (WC).

- Place the cursor on the part name and press the Selection button. The name will be loaded into the **Part** edit box.

- Choose the **OK** button to accept this part.

- The command now works like any other **Tools** function. You are creating this part until you change tools. Press the Selection button. A frame will appear attached to the cursor. This is the water cooler.

- Move the cooler to the front of the office and press the Selection button again. The water cooler will be drawn. Pressing the Selection button now will bring up the frame for another cooler. This will continue until you choose another part or a different tool.

- Try dragging and other editing features of the **Tools** menu on the water cooler. Normally these commands would only affect the square, circle or text objects individually.

  Once a part has been created you may want to edit it. This is done with the **Explode** command under the **Tools** menu. It breaks a part

back into its individual objects. This way additions or changes can be made. The objects must be regrouped after the changes and given a name. To explode a part choose the command, select the part (highlighted when selected), and press the Selection button to accept. The objects are then separate.

Another important feature of Draw is Layering. This allows you to break a drawing up. For example, in the office layout all of the electrical symbols could be placed on a single layer separate from everything else. This way a view could be generated showing only the electrical without any other confusing objects.

Draw lets you create 250 different layers and show any number of them at a time. There are 2 parts to this function. The first lets you choose the active layer to put objects on and the other is for selecting the layers to be shown.

First, choose a layer to put all of the electrical objects on.

To choose the active layer:

- Select **Layer** from the **Preferences** menu. The layer requestor will be presented.

- The currently active layer (the one everything else you've made is on) is A0. Place the cursor on the intersection of A and 1 and press the Selection button. It will darken to indicate it is selected.

- Choose the **OK** button to exit the requestor.

Now that the active layer has been changed the objects to put on the layer can be created. The next few steps quickly outline making the electrical outlets and lights in the office.

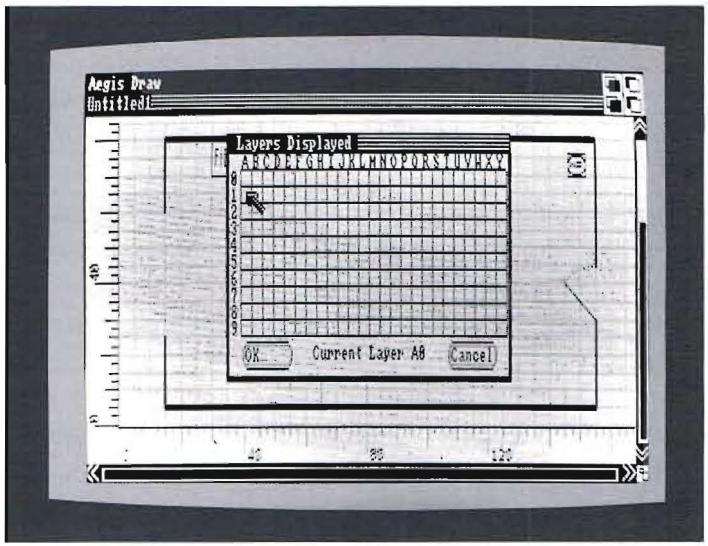


Figure 6.3 Selecting the Active Layer. Draw supports a multi-layer environment. There are 250 layers available for use. When objects are created they are assigned to the active layer. The active layer is chosen by selecting **Layer** from the **Preferences** menu. Once the layer requestor is presented clicking in the cell created by the intersection of a letter and number will select that layer as active. The default layer is A0.

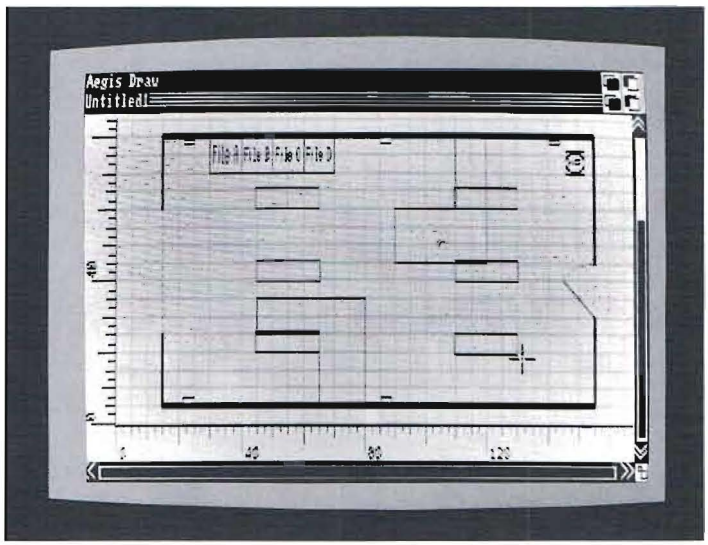


Figure 6.4 Creating the Electrical Layer. All of the overhead lights and wall outlets in the office example are assigned to a different layer. This is done by changing the acive layer before the objects are created. Later the drawing can be viewed or plotted with or without the electrical layer by choosing the layers to display with the **Layers Shown** command.

To make the electrical objects:

- Select a new color for these objects. Choose the dark blue from the **Color** menu.

- Select **Rectangle** from the **Tools** menu and make a very small rectangle. This will represent a wall outlet so make it the appropriate size.

- Next, make a larger rectangle. This will represent overhead fluorescent lights.

- The next step will require the **Data Snap** and **Grid Snap** functions to be turned off. The functions have been on through the tutorial so far. Select **Data Snap** from the **Preferences** menu. A sub-menu box will open to the right. Choose **Off** from this box. Repeat this with **Grid Snap**.

- Select **Clone** from the **Tools** menu.

- Select the small rectangle. Move the frame to a point near the front desk and place it in the wall. Press the Selection button. Repeat this step and place outlets around the office. Don't forget the water cooler.

- Now Select the large rectangle and repeat the process above except place the lights in a regular overhead pattern.

- Select **Erase** from the **Edit** menu and remove the originals from the drawing.

  Now the drawing is beginning to become cluttered. Here's the beauty of layering; choose to display only the first layer and all of the electrical will disappear.

To choose the display layers:

- Select **Layers Shown** from the **Display** menu. The layers requestor will be presented.

- Place the cursor on the intersection of A and 1 (the electrical layer) and press the Selection button. It will lighten to indicate it is no longer active.

- Choose the **OK** button to exit the requestor. The display will change to show the drawing without the electrical.

  One last detail and the basic office layout will be complete. All it needs are a few dimension lines. Draw has an easy solution to this, automatic dimension lines.

To create dimension lines:

- Turn the **Data Snap** option back on. To do this select **Data Snap** from the **Preferences** menu. Choose the sub-menu option **On**.

- Select **Dimension** from the **Tools** menu. This function operates like the **Line** command.

- Place the cursor on the same grid line as the top wall and press the Selection button.

- Move the cursor to the same grid line as the bottom wall and press the Selection button again. A dimension line will be drawn between the two points.

- Try placing a few other dimension lines on your drawing. The function will work at any angle or distance.

  Once a drawing is complete the next step is to print or plot it onto paper.

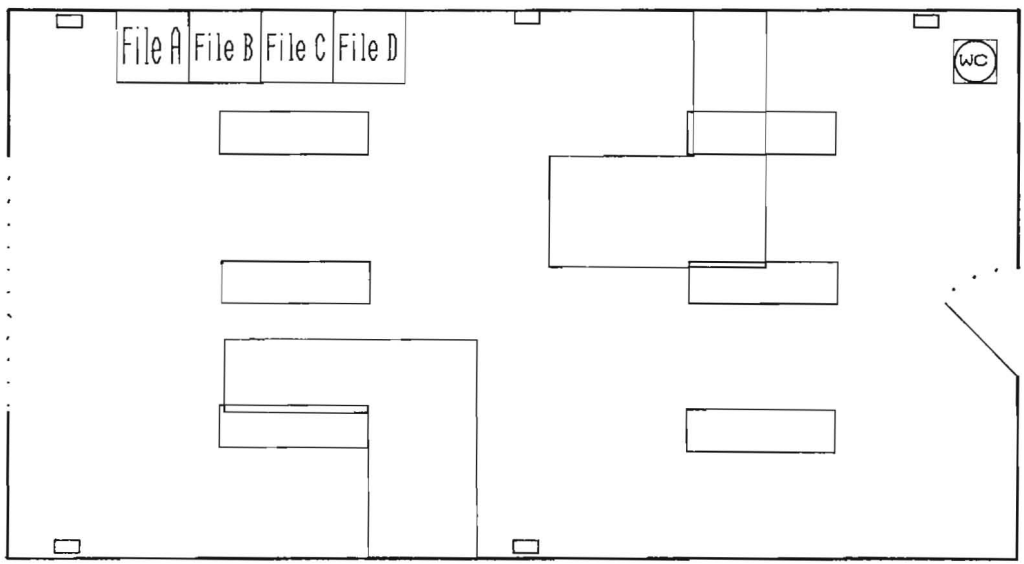


Figure 6.5 The Finished Drawing. Once a drawing is complete it may be printed or plotted on paper. Printing the drawing will produce the current view of the window. Sending the drawing to a plotter will produce the drawing regardless of the view (zoomed, etc.). Portions of a drawing can be plotted by use of the **Format** command. If the grid lines are turned on they will be printed or plotted with the drawing.

To plot your drawing:

- Be sure the plotter is turned on and connected to the computer.
- Select **Plot** from the **Project** menu. Draw will attempt to create a plot file on disk. If there is enough room the program will send all of the commands to this file first and then execute the plot from there. This will free up Draw sooner so you can use it while the plot is running.

To print your drawing:

- Be sure the printer is plugged in and turned on. The Preferences menu on the Amiga should be set properly as Draw will print directly to there.
- Select **Print** from the **Project** menu.

SECTION

3

ADVANCED USER'S REFERENCE

CHAPTER

7 The Working Environment: Windows, Grids, and Rulers

The working environment of Aegis Draw consists of a desk top on which work areas called "windows" are manipulated. The windows have gadgets for adjusting their size, position on the screen, portion of the drawing they display, and for removing them from the screen. There is a starting window that is always present. Windows also make use of rulers and grids which can be turned on or off independently.

Rulers show the exact position of objects in a drawing relative to the format you have chosen. They occupy the left and lower portion of a window when active.

The grid is used like the lines on a piece of graph paper to position objects and shapes accurately. Like rulers, they can be turned on or off in each window.

Windows

Each window can hold a separate drawing or different views of the same drawing. You may open as many windows as you have memory for. Those using Draw with 512K Amigas will need to be careful since

each window uses 64K of RAM when opened. Draw will limit you to a number of windows it considers to be safe. On a 512K Amiga you will be allowed to open two windows. Draw will take advantage of any additional memory you have installed and allow more windows to be used.

The right and bottom borders of each window house the scroll controls. Inside each border is a slider. The sliders change size in proportion to the amount of drawing being displayed in the window. So, if the window displays the entire drawing, the sliders will be full size. If the window displays half the drawing the slider takes up half the border. Scrolling horizontally through the drawing simply involves grabbing and dragging the slider in the bottom border in the direction you want to go. When the mouse button is released the view in the window changes. To scroll vertically use the slider in the right border. Small scrolling adjustments can be made by clicking on the arrow buttons located on each end of the slider controls. These can also be used when you are zoomed in too far for the sliders to be accurate.

The windows may be moved about on the screen by dragging the top border, or resized with the gadget in the bottom right corner. The window will retain the same view after a size change with the image enlarged or reduced to fit the new size. Draw uses the width of the drawing being displayed as a "baseline". If you change the shape of the window (narrower/wider), Draw will maintain the correct aspect ratio of the drawing.

The background color for each active window can be changed to any of the colors in the color palette. This function is discussed in detail later under **Set Color**.

To scroll through a drawing:

- Click on the arrow gadget located in the bottom and right borders. You may also click in the border itself or drag the indicator to the relative position in the drawing you want to see. To drag the indicator,

place the cursor on the indicator (the dark portion of the border) and hold the button down. It will highlight to indicate it is selected. Now drag the cursor to the portion of the drawing you want and release the button.

To resize a window:

- Place the cursor on the resize gadget (extreme lower right corner of the window) and hold down the Selection button. A ghost frame will appear.

- Drag the cursor until the ghost frame is the size you want and release the Selection button.

To close a window:

- Click in the close box (extreme upper left corner of the window). If this is the only window displaying a particular drawing, you will be prompted to **Kill Existing Drawing?**, since Draw will clear the drawing from memory.

To bring a window to the front:

- Click on the Window Forward gadget (extreme upper right corner of the window). It's the one with the clear window in front.

To move a window to the back:

- Click on the Window Back gadget (extreme upper right corner of the window). It's the one with the solid window in front. If you want to draw in a different window, you should click on the title bar in order to make the window active.

Grid

Grids are used for accurate positioning of objects on the drawing. The grid size, line pattern, and color can all be adjusted individually in each active window. Grids can also be turned on or off during drawing. When you resize a window or perform a zoom, the grid is automatically set to a logical value. You can override this manually with the **Grid Size** item in the **Options** menu.

Another feature is **Grid Snap**. When active this option "snaps" or lines up objects created to the nearest intersection of the grid. This allows you to create shapes with a high degree of accuracy. **Grid Snap** is independent of the display of the grid.

Adjusting the grid color is discussed under the **Set Color** command.

Grid On/Off

To turn the grid on or off for the active window select **Grid On/Off** from the **Display** menu.

Grid Pattern

The same line patterns available for creating shapes can be used for the grid lines. There are 9 different patterns to choose from. The default line pattern is solid.

To change the grid pattern in the active window:

- Select **Grid Pattern** from the **Options** menu. A sub-menu box will open to the right of the selection displaying the available line patterns.
- Drag the cursor until it highlights the line pattern you want and release the Menu button. The grid pattern in the active window will change to the new selection.

Grid Size

Grid Size allows you to change the width between lines in the grid. Both the horizontal and vertical lines may be set independently. Grid size is reset when you resize a window or use Zoom. This is to prevent the lines from getting "bunched" together.

To adjust the size of the grid in the active window:

- Select **Grid Size** from the **Options** menu. A requestor will open on the screen.
- Enter the new values in the edit boxes and select the **OK** button to accept the new values. Choose **Cancel** to back out of the operation with no changes made.

Grid Snap

Grid Snap will override many of the other functions in Draw such as **Data Snap**. **Data Snap** will automatically connect two lines if they are close together when created. If **Grid Snap** is turned on it will override this option and force the line to the nearest grid intersection instead.

The grid intersections are absolute values. In some cases it is impossible to get a perfect value to the highest precision because the resolution of the screen will not support it. For example, in a full display placing the cursor at the y=10, x=12 intersection may produce a y value of 10.0025 and an x value of 12.0345. Moving the cursor about produces changes in the numbers but the absolute value of 10.0000 and 12.0000 cannot be achieved without using the **Zoom** function. This moves in to a level where those numbers can be supported by the screen. The **Grid Snap** option automatically sets the grid intersections to these absolute values, so shapes created with this option on are precise to the highest level. **Rounding** can also be used to eliminate some of this roundoff error by limiting the fractional portion to one decimal place.

To turn Grid Snap on or off in the active window:

- Select **Grid Snap** from the **Preferences** menu. A sub-menu box will open to the right displaying the current state. The item check marked is the active condition.

- Drag the cursor until it highlights the selection you want (On or Off) and release the Menu button. If you open the menu again the check mark should be next to the option you chose.

Repaint Grid

This option quickly redraws *just the grid pattern* in the active window. This is handy when working on large drawings. Rather than waiting for an entire drawing to be redrawn just to refresh a portion of the grid you may have erased, it's faster to use **Repaint Grid**.

To refresh the grid in the active window:

- Select **Repaint Grid** from the **Display** menu.

Rulers

The rulers display your position relative to the entire drawing. You may set the units the rulers will display. Both Metric and English standards are supported.

The rulers occupy the left and bottom borders when active. They cannot be repositioned but the view of a window can be adjusted to place a ruler anywhere on a drawing. The start and end points of the ruler can be set with the **Format** command.

The color of the rulers may be changed with the **Set Colors** command.

Rulers On/Off

To turn the rulers on or off in the active window select **Ruler On/Off** from the **Display** menu.

Units

Units allow you to set the type of ruler display you see on the screen. English units set the ruler to have divisions of 1/2, 1/4, 1/8 etc... Metric units will divide the ruler into 1/10's, 1/100's, etc. The actual numbers in the ruler reflect the real coordinates in the drawing. They can represent any "real world" units you work in.

To select the type of units displayed on the rulers:

- Select **Units** from the **Options** menu. A sub-menu box will open to the right displaying the current state. The item check marked is the active condition.
- Move the cursor until the type you want is highlighted and release the Selection button.

Set Color

Each window may have its own color arrangement. The background, grid, and rulers can all be adjusted individually. Any color in the current color palette may be used.

Background

To change the background color in the active window:

- Select the desired new color from the **Color** menu.
- Select **Set Color** from the **Display** menu. A sub-menu box will appear to the right of the selection.
- Drag the cursor until it highlights **Background** and release the Menu button. The background will change to the new color.

Grid

To change the grid color in the active window:

- Select the desired new color from the **Color** menu.
- Select **Set Color** from the **Display** menu. A sub-menu box will appear to the right of the selection.
- Drag the cursor until it highlights **Grid** and release the Menu button. The grid will change to the new color.

Ruler

To change the ruler color in the active window:

- Select the desired new color from the **Color** menu.
- Select **Set Color** from the **Display** menu. A sub-menu box will appear to the right of the selection.
- Drag the cursor until it highlights **Ruler** and release the Menu button. The rulers will change to the new color.

Zoom

Zoom lets you get in and work in detail on a drawing. There are three ways of using this option: zooming in on a drawing in the active window, zooming out, and creating a separate window for the zoom. This last feature gives you the ability to see both the enlarged version and the original at the same time. Both windows will display any changes you make in either window. The level of zoom available is nearly infinite and as you zoom in or out, the rulers will adjust their display accordingly.

In

Zooming in is easy. You just choose the area you want to see in detail by placing a frame around it. The window then changes to display the contents of your frame enlarged to fill the entire window.

To Zoom In on an area in the active window:

- Select **Zoom** from the **Display** menu. A sub-menu box will open to the right with the available options.
- Drag the cursor until **In** is highlighted and release the Menu button.
- Place the cursor on one corner of the area you want to enlarge and click the Selection button.
- Move the cursor to the opposite corner of the area. A rubber band frame will appear between the first point and the cursor. When the frame encloses the area you want click the Selection button again.

Out

The **Zoom Out** option works in reverse of **Zoom In**. It performs a reduction of the image. This is done by doubling the area in the window. Each use of the function will double the display space both vertically and horizontally. Once the normal display area is achieved, the function will have no effect.

To Zoom Out of a drawing in the active window:

- Select **Zoom** from the **Display** menu. A sub-menu box will open to the right displaying the available options.
- Drag the cursor until it highlights the **Out** option and release the Menu button.

Window

Using this version of the command will create a separate window to display the zoomed area. The original window is not affected. Any editing done in either window will be displayed in both windows. If Draw decides there isn't enough memory for a new window, you will get the message **Insufficient Memory**.

To create a separate window to display a zoomed area:

- Select **Zoom** from the **Display** window. A sub-menu box will open to the right showing the available options.
- Drag the cursor until it highlights the **Window** option and release the Menu button.
- Place the cursor on one corner of the area you want to enlarge and click the Selection button.
- Move the cursor to the opposite corner of the area. A rubber band frame will appear between the first point and the cursor. When the frame encloses the area you want click the Selection button again.

Full Display

Once you have zoomed into a drawing the time will come when you want to return to the original display. The **Full Display** command performs this function. It backs you out of any number of zooms (In or Out) you have performed. If you are already at the original display the function will have no effect except to refresh the drawing.

To return to the original display:

- Select **Full Display** from the **Display** menu.

Crosshairs

When active, the **Crosshairs** function attaches a set of rubberband lines to the cursor. They extend vertically and horizontally for the full length of the window and cross at the center of the cursor. They may be used as an aid in lining up objects on the screen.

When the **Grid Snap** function is turned on the crosshairs may seem to drag behind the cursor. This is because the crosshairs are snapping to the nearest grid intersection. This can be very useful as **Grid Snap** will effect all functions that read the cursor location off the screen, **Crosshairs** will show you "where you are" on the screen.

To turn the Crosshairs on or off:

- Select **Crosshairs On/Off** from the **Display** menu.

Numerical Display

As an added aid to object placement Draw has a numeric display of the cursor position. When active the current x,y coordinates of the cursor are displayed in the menu bar. The coordinates are relative to the rulers and are accurate to the fourth decimal place.

The x coordinate represents the horizontal ruler position and the y coordinate the vertical position.

When using the numerical display you may note it is often next to impossible to get a reading where all the decimal places on both coordinates are zero. This is because that position is smaller than a pixel on the current screen. If you want to use exact measurements where all decimal places are zero, switch on **Grid Snap**. This automatically imposes a "snap" to the exact grid coordinate. If you want to get an exact position that won't appear, perform a **Zoom In** to the area

and try again. You can also change **Grid Size** or **Set Rounding** in the **Options** menu.

To turn the numerical display on or off:

- Select **Numeric Display** from the **Preferences** menu. A sub-menu box will open to the right displaying the two options.
- Move the cursor until the option you want is highlighted and release the Selection button.

CHAPTER

8 Tool Options

Each of the tools used to create objects in Draw have options controlling their appearance on the screen. The color, thickness, and pattern of the line are all adjustable. Once a tool has been chosen as the active shape it uses the currently active values of these options. If another shape is chosen it will use the same options.

Colors

There are 16 colors available in the 640 X 200 resolution mode of the Amiga. The color palette in Draw supports all 16 of these colors. The color slots in the palette can be thought of as ink wells. The color in each well can be adjusted to produce any of 4096 different colors available on the Amiga. Any object created with the ink of a well will change its color if you adjust the color of that well.

The first 3 colors in the palette (dark blue, white, and black) are used by draw for the desktop, menu bar, and windows. Any adjustment of these colors will change the way Draw appears on the screen. For example, changing the white to black would render the menus unreadable.

Modifying the Color Palette

The **Modify Colors** command under the **Colors** menu displays the color edit requestor on the screen. The requestor contains a color palette and several gadgets for adjusting the colors. The large block of color on the right of the palette is the currently active color. You change the active color by clicking on the color you want in the color palette.

Below the palette are 3 slider controls for adjusting the Red, Green, and Blue components in the active color. Moving a slider to the right increases the amount of red, green, or blue (depending on which slider) in the active color, while moving to the left decreases.

When the requestor first appears, the RGB sliders have no affect. You must first choose a color before they will operate.

There are also 3 buttons: **OK**, **Cancel**, and **Reset**.

Ok accepts all changes made to the palette and returns to the regular drawing mode.

Cancel erases any changes made to the palette during the current use of the requestor and returns to the regular drawing mode.

Reset changes the palette back to the original colors it contains when Draw first starts up.

To change the colors in the color palette:

- Select **Modify Colors** from the **Colors** menu. A requestor will appear in the center of the screen.
- Choose the color to change. The active color block will change to the color you chose.
- Adjust the RGB controls until the color is the one you want.

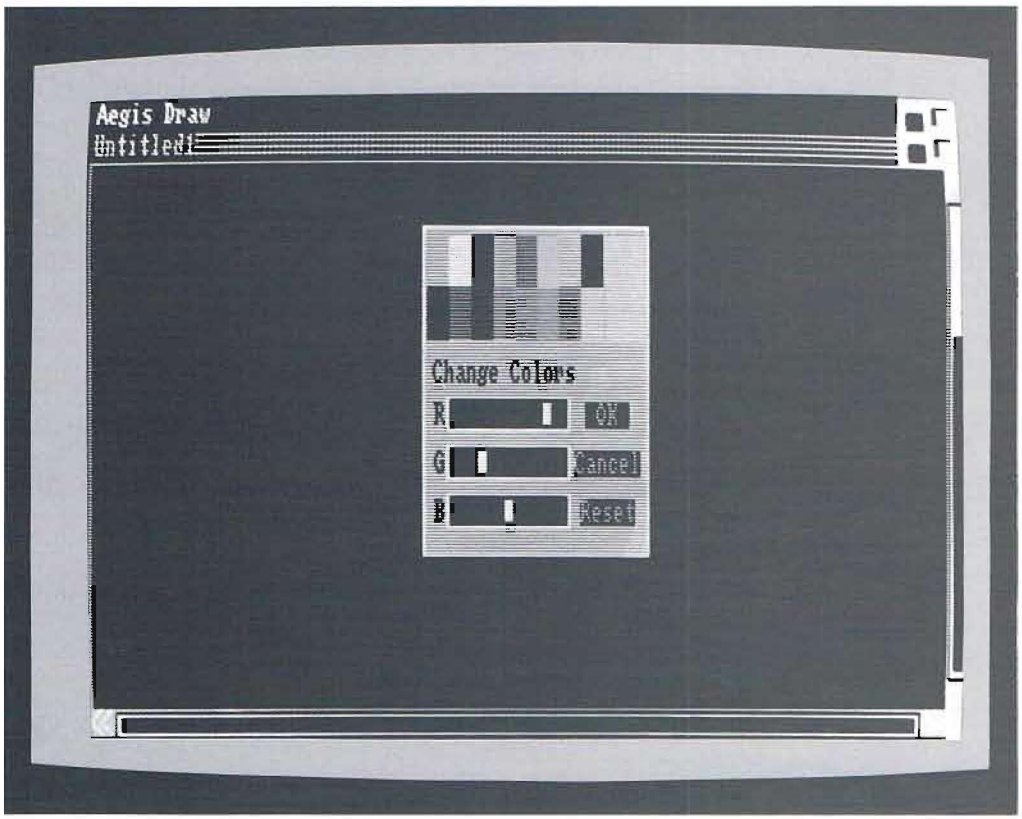


Figure 8.1 Modify the Color Palette. *There are 16 different colors available in Draw. The first three colors in the palette (numbered 0, 1, and 2) from left to right at the top are used in the menus and requestors. The colors may be changed to any of 4096 different hues by use of the* **Modify Colors** *function under the* **Colors** *menu. Selecting this command produces a requestor with the color palette three sliders and three buttons. On the right of the palette is a large block of color. This is the currently active color in the requestor. The sliders control the amount of Red, Green, and Blue in the color being changed. The* **OK** *button accepts any changes made in the requestor and closes it. The* **Reset** *command changes the colors back to their default values, and the* **Cancel** *button exits the requestor without keeping any changes. To change a color click on it in the requestor without keeping any changes. To change a color click on it in the requestor palette. The active color block will change to that color. Adjust the R.G.B. slider controls until the color is the one you want. Make other changes as you need then choose* **OK** *to accept the changes.*

- Click on the **OK** button to accept the changes you made. Use **Cancel** to back out with no changes made.

Line Weights, Patterns

The lines used to create shapes are defined by their weight (thickness) and pattern. There are 3 line weights and 9 patterns available. The weights are single, double, and triple line thickness. The patterns range from solid to dotted.

To adjust the line weight:

- Select **Line Weight** from the **Options** menu. A sub-menu box will open to the right showing the three weights available.

- Move the cursor until the weight you want is highlighted and release the Menu button.

To change the line pattern:

- Select **Line Pattern** from the **Options** Menu. A sub-menu box will open to the right showing the line patterns to choose from.

- Move the cursor until the line pattern you want is highlighted and release the button.

Filled and Outline Preference

Shapes can be created either filled with a pattern or in outline form. This option is a preference which can be turned on or off. When turned on all shapes created will be filled with the current fill pattern.

This option is also active when using the **Color** command from the **Tools** menu. When **Filled** is turned on, using the **Color** command to

edit an already existing shape will cause it to be filled. This is a good shortcut to use when creating a lot of shapes both filled and outline. Rather than switching the preference back and forth through the menu just create all the shapes in outline form and then go back with the **Color** tool to change the filled shapes.

Not all shapes can be filled. Text, Arcs, and Dimensions cannot be filled.

To change the Filled preference:

- Select **Filled** from the **Preferences** menu. A sub-menu box will open to the right showing the two options (**On**,**Off**).
- Move the cursor until it highlights the desired option and release the menu button.

Fill Patterns

Filled shapes are created with the currently selected fill pattern. There are 8 different patterns ranging from a solid fill to mesh weave. They are line patterns designed for use with plotters.

To change the current fill pattern:

- Select **Fill Pattern** from the **Options** menu. A sub-menu box will open to the right displaying the available patterns.
- Move the cursor until the highlight box is around the pattern you want and release the Menu button.

CHAPTER

9 Tools

The shapes listed under the **Tools** menu are the basic building blocks for creating drawings. There are tools for drawing lines, rectangles, circles, arcs, polygons, freehand images, and text. There is also a tool for creating dimension lines that automatically display their numeric value. Another important feature is the ability to identify a group of shapes as a part. Once stored, a part can be recalled again without having to redraw the individual shapes.

The shape tools all work in a consistent manner: choose the shape from the menu, place the cursor at the starting point for the shape, press the Selection button, move the cursor to the next point and press the Selection button again. Some shapes like polygons require more than two points for definition. In this case the last step is repeated until the shape is complete and then the Selection button is pressed twice (double click) in rapid succession. Freehand works like a "pen", while you hold down the left button you are drawing a freehand line. To abort the creation of a shape at any time press the Menu button.

Line

The line tool will allow you to create as complex a shape as you need. It uses a system known as "give one" which means each end point of a newly created line becomes the beginning point of the next line until you turn the tool off. This way a complex shape is just a series of points as you move to create it.

If the **Filled** option is turned on, Draw will attempt to fill the shape you have created even if it has open sides.

To draw a line:

- Select **Line** from the **Tools** menu.
- Place the cursor where you want the line to begin and click the Selection button.
- Move the cursor to where you want the line to end and click the Selection button again. If you want to create another line from this point move the cursor again.
- When the shape is complete double click the Selection button.

Rectangle

To draw a rectangle:

- Select **Rectangle** from the **Tools** menu.
- Place the cursor where you want one corner of the rectangle to be and click the Selection button. A ghost rectangle will appear attached to the cursor.
- Move the cursor to the opposite corner of the rectangle and click the Selection button again.

Polygon

To create a polygon:

- Select **Polygon** from the **Tools** menu.
- Place the cursor on the first point of the polygon and click the Selection button. A ghost line will appear under the cursor.
- Move the cursor to the next point of the polygon and click the Selection button again. Continue this step for each point of the polygon.
- When the polygon is the shape you want, double click the Selection button. This will end the polygon create sequence.

Freehand

It is recommended you use freehand sparingly as it uses a lot of memory. Many shapes you would use freehand for can be made with **line** and the **smoothing** option.

To create freehand shapes:

- Select **Freehand** from the **Tools** menu.
- Hold the selection button down and move the cursor.
- When the freehand line is the shape you want, let go of the Selection button .

Arc

To create arcs:

- Select **Arc** from the **Tools** menu.

- Place the cursor on the center of curvature of the desired arc.
- Move the line until you get the desired radius and starting point for the arc. Click the Selection button to set the radius and starting point.
- Drag the arc until you reach the desired ending point. Arcs are drawn counter-clockwise in Draw. This corresponds to the cartesian coordinate system used in drawings. Click the Selection button to set the ending point of the arc.

Circle

A circle is actually a polygon with 72 points. If you are connecting a line to a circle with **Data Snap** the line will connect with one of these points.

To create a circle:

- Select **Circle** from the **Tools** menu.
- Place the cursor where the center of the circle is to be located and click the Selection button.
- Move the cursor away from the center. A ghost circle will appear under the cursor.
- When the circle is the size you want click the Selection button again.

Text

In Aegis Draw, text is handled in the form of labels. You create a label by entering text into an edit field and then placing it in the drawing. The text is created using a stroke font. A stroke font creates a letter by using the strokes that make up the character rather than reproducing a bit image. This creates a clear readable font at almost any size.

To create a text label:

- Select **Text** from the **Tools** menu. The text edit requestor will appear.
- Click inside the edit field. If there is already text inside the field use the arrow keys to move to the end of the text (Shift - right arrow will jump to the end of the text). The backspace key can be used to erase the text.
- Enter the text from the keyboard.
- When the label is complete click on the **OK** button. To back out of creating the label click on **Cancel**.
- The text tool works like the **Rectangle** tool at this point. You create a rectangle defining the area the text will print in. Place the cursor on one corner of the area and press the Selection button.
- Move the cursor to the opposite corner of the area and click the Selection button. The rectangle may be any size in height or length that you need. Draw will adjust the text to fit into this space.

Dimension Lines

To create a dimension line:

- Select **Dimension** from the **Tools** menu.
- Place the cursor at the beginning point of the line and click the Selection button. A ghost line will appear under the cursor.
- Move the cursor to the end point of the line and click the Selection button again.

Part

Parts are a very powerful feature of the Draw program. Parts can be thought of as drawings within drawings. You can collect various drawing elements (lines, polygons, text, arcs, dimensions, and even other parts) and create a new element with a name of your choosing. If you are designing the layout of several offices, you could create parts for chairs, desks, and even water coolers. These parts can be stored on disk for use in future drawings.

Once in a drawing, the part can be manipulated with the same tools you use to modify a line, arc, text, or other graphic element. If the part contains dimension lines, those lines will reflect the real dimension of the part. If the part is resized, the dimension is recalculated.

When you save your drawing, the parts used in that drawing are saved in the drawing file. If you need to send a copy of the drawing (on disk) to another user of Draw, you don't have to worry about forgetting a part, Draw keeps those parts "In Stock" for your use. You can create a library of parts by saving individual parts to disk.

Sometimes the part is larger than the window you are using. If you try to place a part into this window the message **Part Is Too Large** will be displayed. To solve this problem choose a smaller part, **Zoom Out**, or resize the part in a larger window and use the **Edit** menu to copy it into your active window.

More information can be found on parts under the **Group** command in Chapter 11 and in Chapter 13, The Parts Library.

To place a part in the drawing:

- Select **Part** from the **Tools** menu. If the drawing has no parts "In Stock", you will get the message **Drawing has no parts**. You can create a part with the **Group** function in the **Edit** menu, or use the **Open Part** function in the **Project** menu.

- If the drawing does have parts, a window will appear listing the "Parts In Stock" for that drawing. Click on the part you want to use. You can also type the name of the part in the edit field, by clicking in the box titled "Part" and typing in the name of the part. When the part name is correct press RETURN or select the **OK** button. If the part you have chosen cannot be found in the drawing, you will get the message **Can't Find The Part**, select a new part by repeating the steps above.

- Once you have selected a part, click the Selection button on the drawing. A rectangle representing the part will appear attached to the cursor. Drag the rectangle to where the part should be placed and press the Selection button to put the part down.

CHAPTER

10 Editing Objects

The edit functions under the **Tools** menu are used to adjust individual objects or shapes. There are commands to move, rotate, copy, erase, and change the size or color of objects. You can move objects behind others, explode parts into their sub-pieces, and fine tune shapes from the keyboard.

The editing tools all work in a similar manner: choose the tool, place the cursor on the shape, and click the Selection button to choose the object. Once chosen the shape may then be altered. Press the Menu button to back out of editing an object once it has been selected.

When choosing a shape be sure to place the cursor on one of the lines making up the shape. Draw sees a rectangle for example, as a series of 4 lines. Placing the cursor inside the rectangle would have no effect. The cursor must be on one of the lines for Draw to recognize which object to choose. If **Grid Snap** is on, Draw will read the coordinate from the nearest grid intersection and may not recognize the object you are trying to select.

Something else the editing tools have in common is the selection point used when the object is chosen for editing. This point is the focal

point for the action. Rotation as an example, occurs around the point where you place the cursor when you choose the object. When dragging an object the point is the "handle" for the drag.

Drag It

The **Drag It** function moves an object from one point to another. The point of the object you click on to choose it for dragging becomes the handle.

If you need to align the object to a specific set of coordinates turn on the crosshairs first. Then choose a piece of the object like a corner for the alignment by clicking on it to select the object. Once the object is selected move the crosshairs to the new position.

To drag an object:

- Select **Drag It** from the **Tools** menu.
- Place the cursor on the object to move and click the Selection button. A ghost frame appears around the object when it is selected.
- Move the cursor to the new position. The ghost frame will follow the cursor.
- When the ghost frame is correctly positioned in the new location click the Selection button. The object will be erased from the old position and redrawn in the new.

Rotater

Rotater lets you grab an object and move it in a clockwise or counter clockwise manner. The axis of rotation is at the point you click on when you select the object for rotating.

To rotate an object:

- Select **Rotater** from the **Tools** menu.
- Place the cursor on the object to rotate and click the Selection button. A ghost frame appears around the object when it is selected.
- Move the mouse in a circular motion until the frame is aligned where you want the object repositioned. You have better control of the rotation the further from the axis your cursor is located. For example, if you rotate the object with the cursor in the same position as the axis the frame will jump as much as 90 degrees with a small movement of the mouse. Moving the cursor away from the axis first however, will give you a degree by degree control of the rotation.
- When the frame is where you want it click the Selection button again.

Clone

Clone makes an exact copy of the selected object and allows you to move the copy in a manner similar to the **Drag It** function.

To make a copy of an object:

- Select **Clone** from the **Tools** menu.
- Place the cursor on the object to copy and click the Selection button. A ghost frame appears around the object when it is selected.
- Move the cursor to the new position. The ghost frame will follow the cursor.
- When the ghost frame is correctly positioned in the new location click the Selection button. The object will be copied into the new position.

Eraser

To erase an object from a drawing:

- Select **Eraser** from the **Tools** menu.
- Choose the object to erase. A frame will appear around it to indicate it is selected.
- Press the Selection button again to erase the object. To cancel the command press the Menu button.

Remember, if you make a mistake you can always UNDO your last action, just don't do something else before you forget to UNDO that mistake.

Explode

Explode breaks a part back into its component objects. This allows editing of a part.

To break a part back into its sub-components:

- Select **Explode** from the **Tools** menu.
- Choose the part to explode. A frame will appear around it to indicate it is selected.
- Press the Selection button again to accept the choice. The individual elements of the part are now as they were before the **Group** command was issued. To cancel the command press the Menu button.

Sizer

The **Sizer** function adjusts the current size of a shape. When the shape is selected there are two frames that appear. The first identifies the

shape in the normal manner and the other is an adjustable frame for displaying the new size of the object. Sizing is done in a proportional manner.

To change the size of an object:

- Select **Sizer** from the **Tools** menu.
- Choose the object you wish to change. Two frames will appear around the object.
- Move the cursor to adjust the second frame. When the frame outlines the size you want the shape to be press the Selection button. The shape will be erased and then redrawn in the new size. To abort **Sizer** press the Menu button at any point.

Back

As you create a drawing Aegis Draw stores the order the shapes are made in. When the drawing is refreshed the shapes are redrawn in this same order. This is important when you want certain shapes to appear on top of others. The **Back** function allows you to change this order by moving an object behind another. When an object is edited with **Back** it is moved to the head of the drawing list so it is the first object drawn.

To move an object behind another:

- Select **Back** from the **Tools** menu.
- Choose the object to change. A frame will appear around it to indicate it is selected.
- Press the Selection button again to confirm your selection. To abort the operation press the Menu button.

Color

The **Color** function can be used not only to change the color, weight, and pattern of an object but whether it is outlined or filled, smoothed or normal as well. **Color** looks to the **Filled**, **Outline**, and **Smoothed** preference when changing the color of an object.

To change the color of an existing object:

- Select **Color** from the **Tools** menu.
- Choose the new color from the **Color** menu.
- Select the object to change. A frame will appear around it to indicate it is selected.
- Press the Selection button again to confirm your choice. To abort the action at any time press the Menu button.

Stats

Stats allows you to set the parameters of an object by entering numbers directly. Each type of element has its own stat window. A circle would have a window showing radius and center coordinates, text would show you the text, location, and width/height of the individual characters. If you select a line, polygon, or rectangle you will get information on the coordinate of the closest point.

Each requestor has a **Modify** and **Cancel** button, and one or more edit boxes containing parameters about the selected object. To adjust an object directly enter the changes in the edit boxes and then click on the **Modify** button to accept the changes. To exit the requestor without any changes being accepted use the **Cancel** button.

To use the stats function:

- Select **Stats** from the **Tools** menu.
- Choose the object to change. A frame will appear around it to indicate it is selected.
- Press the Selection button again to accept the choice. A requestor will appear with the **Stats** information. To cancel the command press the Menu button.
- Use the keyboard to change the information in the edit boxes. Once all the parameters are the way you want them select the **Modify** button. To exit the requestor with all changes ignored use the **Cancel** button.

CHAPTER

11 Editing Areas

The commands under the **Edit** menu are similar to the editing functions in the **Tools** menu. Instead of changing individual objects though, they affect all of the objects in an area. Another difference is the **Edit** commands only work once per menu selection. Unlike the **Tools** editing commands which stay turned on until you choose another tool, everything under the **Edit** menu works only once. So if you choose to **Size** an area and abort (or complete) the operation you will need to choose it again to continue using the **Size** function.

Most of the commands work using an area known as the "clipboard". This is a separate area where objects may be "cut" or "copied" to and "pasted" from. For example, to make a duplicate of a circle and several lines requires only selecting **Copy** and then framing the area to duplicate. The contents of the frame are then copied into the clipboard. Once there, they may be pasted back into the drawing at any point with the **Paste** command.

The **Cut**,**Copy**, and **Paste** features may also be used to move areas to other drawings. By loading two drawings at once in different windows, objects may be moved from one to the other via the clipboard.

Undo

The **Undo** function works with both the **Tools** and **Edit** menus. Its basic function is to remove the last action from the drawing. Such actions as creating, erasing, rotating, or dragging a shape are all "undoable". So are the **Cut** and **Paste** features. You cannot undo an **Explode**, **Part**, or **Group** action. The **Undo** menu selection will appear shaded and be unselectable when it cannot be used.

To remove the last action from the drawing:

- Select **Undo** from the **Edit** menu.

Cut

Cut erases an area from the drawing and copies it into the clipboard. Use this function with **Paste** to move a series of objects to another point on the drawing.

To cut an area out of a drawing:

- Select **Cut** from the **Edit** menu.
- Place the cursor at one corner of the area you want to cut and press the Selection button.
- Move the cursor to the opposite corner. A frame will appear around the area. Be sure the objects you want to move are entirely enclosed by the frame.
- When the frame encloses all the shapes to cut, press the Selection button again. The objects inside the frame will be cut from the drawing into the clipboard.

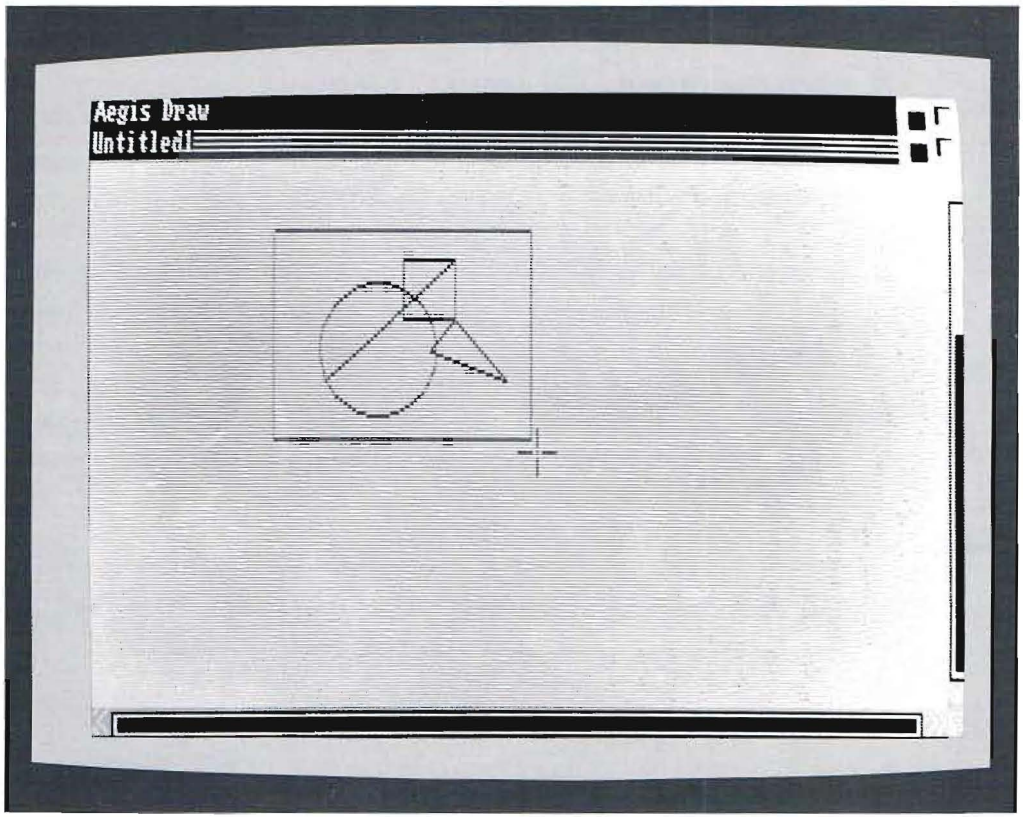


Figure 11.1 Using a Selection Frame. *All of the edit commands use a selection frame to define the area they are to change. For example, to use the* **Copy** *command first select it from the* **Edit** *menu. Place the cursor above and to the right of the objects you want to copy and press the Selection button. Move the cursor to the opposite corner. As you move the cursor a frame appears. This is the selection frame. All of the objects completely inside the frame when it is complete will be copied to the clipboard by this action. When the frame is correct press the selection button again. The important point about the frames is that an object must be enclosed entirely by the frames for the action to be performed on it. Objects that extend outside the frame are ignored.*

Copy

Copy works similar to **Cut** except the objects are not erased from the drawing.

To copy an area into the clipboard:

- Select **Copy** from the **Edit** menu.
- Place the cursor at one corner of the area you want to copy and press the Selection button.
- Move the cursor to the opposite corner. A frame will appear around the area. Be sure the objects you want to copy are entirely enclosed by the frame.
- When the frame encloses all the shapes to copy, press the Selection button. The objects inside the frame will be copied into the clipboard.

Paste

The **Paste** function works with **Cut** and **Copy**. It pastes anything in the clipboard into a drawing at a specified point.

To paste the contents of the clipboard into a drawing:

- Select **Paste** from the **Edit** menu.
- A frame will appear attached to the cursor. This is the contents of the clipboard. Position the frame where you want the area to be and press the Selection button.

Erase

The **Erase** function removes all the objects inside a selected area from the drawing.

To remove all the objects inside an area:

- Select **Erase** from the **Edit** menu.
- Place the cursor at one corner of the area you want to erase and press the selection button.
- Move the cursor to the oppostie corner. A frame will appear around the area. Be sure the objects you want to erase are entirely enclosed by the frame.
- When the frame encloses all the shapes to erase press the Selection button.

Modify

The **Modify** command has a sub-menu containing a variety of functions for changing an area. The commands work similar to the other functions under **Edit** in that you choose an area first using a frame and then adjust its contents. The functions allow you to change an area's size, rotate it, distort its shape, or adjust the color, pattern, or weight of the lines.

Size

The **Size** command is similar to the **Sizer** under the **Tools** menu. The exception being you choose an area rather than a single object to change. To back out of the operation at any time press the Menu button.

To adjust the size of all the objects in an area:

- Select **Modify** from the **Edit** menu. A sub-menu box will open to the right.
- Move the cursor until **Size** is highlighted and release the Menu button.

- Place the cursor on one corner of the area you want to change and press the Selection button.

- Move the cursor to the opposite corner. A frame will appear around the area. Be sure all the objects you want to change are inside the frame.

- When the frame is correct press the Selection button again. The frame will change to a sizer tool. There are two frames one inside the other. The outside frame shows the areas current size. The inside frame is the new size when the operation is complete.

- Move the cursor until the adjustable frame is correct for the new size of the area and press the Selection button. The contents will be erased and redrawn in the new size.

Rotate

Rotate will move all the objects in an area around the area's center. Like its cousin **Rotater** this function has better control of the rotation the further away the mouse is from the frame during the operation. To cancel the function at any time press the Menu button.

To rotate the objects in an area:

- Select **Modify** from the **Edit** menu. A sub-menu box will open to the right.

- Move the cursor until **Rotate** is highlighted and release the Menu button.

- Place the cursor on one corner of the area you want to rotate and press the Selection button.

- Move the cursor to the opposite corner. A frame will appear around the area. Be sure all the objects you want to rotate are inside the frame.

- Once the frame is correct press the Selection button again. The frame will now move with the mouse. Adjust the frame until the angle of rotation is correct.

- When the area is where you want it press the Selection button to end the operation. The objects will be erased and redrawn in their new position.

Distort

Distort is like the **Size** command except where **Size** adjusts the area proportionally (larger/smaller), **Distort** allows you to change height and width independently. For example, the objects in an area can be stretched very long without changing the height. This also allows for "flipping" an area to create a mirror image. Flipping is done by dragging one side of the selection frame to the opposite side.

As with the other **Edit** commands, you first create a frame around the area to change. The bottom left of the frame is the controlling side. To mirror an object upward on a drawing you would begin the frame on the top and move down. When the frame is complete the bottom frame line will be moved upward. To abort the operation with no changes made use the Menu button.

To change the height/width ratio of all the objects in an area:

- Select **Modify** from the **Edit** menu. A sub-menu box will open to the right.

- Move the cursor until **Distort** is highlighted and release the Menu button.

- Place the cursor on one corner of the area you want to change and press the Selection button.

- Move the cursor to the opposite corner. A frame will appear around the area. Be sure all the objects you want to change are inside the frame.

- When the frame is correct press the Selection button again. The frame will now move in response to the mouse.

- Adjust the frame until it is the new shape you want and press the Selection button. The contents of the frame will be erased and redrawn to reflect the new frame.

Paint

The **Paint** command is a limited version of the **Color** command from the **Tools** menu. It changes only the color of the objects inside the selection frame. **Paint** does not change any other feature of an object (like filled/not filled, line weight, etc.).

To change the color of all the objects in an area:

- Choose the color you want to change all of the objects to from the **Color** menu.

- Select **Modify** from the **Edit** menu. A sub-menu box will open to the right.

- Move the cursor until **Paint** is highlighted and release the Menu button.

- Place the cursor on one corner of the area you want to change and press the Selection button.

- Move the cursor to the opposite corner. A frame will appear around the area. Be sure all the objects you want to change are inside the frame.

- When the frame is correct press the Selection button again. All of the objects in the frame will be erased and redrawn in the new color.

Pattern

Pattern is similar to paint except it is concerned with the line and fill pattern of the objects inside the selection area. If the **Filled** preference is **on** all of the objects in the area will be filled with the current fill pattern. If the preference is **Off** the unfilled objects will be changed to the current line pattern. The color of the objects is not changed.

To change the line or fill pattern of all the objects in an area:

- Select **Modify** from the **Edit** menu. A sub-menu box will open to the right.
- Move the cursor until **Pattern** is highlighted and release the Menu button.
- Place the cursor on one corner of the area you want to change and press the Selection button.
- Move the cursor to the opposite corner. A frame will appear around the area. Be sure all the objects you want to change are inside the frame.
- When the frame is correct press the Selection button again. The objects will be erased and redrawn in their changed form.

Weight

The **Weight** feature of **Modify** changes the line weight of all the objects in the selection frame. The currently selected weight from the **Options** menu is used. The colors, and patterns of the lines are not affected.

To adjust the weight of all the objects in an area:

- Select **Modify** from the **Edit** menu. A sub-menu box will open to the right.

- Move the cursor until **Weight** is highlighted and release the Menu button.

- Place the cursor on one corner of the area you want to change and press the Selection button.

- Move the cursor to the opposite corner. A frame will appear around the area. Be sure all the objects you want to change are inside the frame.

- When the frame is correct press the Selection button again. The objects will be erased and redrawn in their changed form.

Group

Group is used in conjunction with the **Part** tool. The **Group** command combines objects together to make a part out of them. Once the objects have been grouped they are treated by Draw as a single object. Any of the **Tools** commands may be used on them.

A part is given a name when you group it. This name is added to a list of names in stock for a particular drawing. Names may not be duplicated within a drawing.

More information on parts and grouping can be found under the **Part** heading in this section and in Chapter 13, The Parts Library.

To group objects together to create a part:

- Select **Group** from the **Edit** menu.

- Place the cursor on one side of the area to make into a part and press the Selection button.

- Move the cursor to the opposite corner of the area. A frame will appear around the area. Make sure all the objects are enclosed by the selection frame.

- When the frame is correct press the Selection button again. A requestor will appear with an edit box for the name of the part. To exit with no grouping performed select the **Cancel** button.

- Click in the edit box to select it. When the cursor appears in the edit box use the keyboard to type in the name of the part.

- When the name is correct press RETURN or click on the **Name** command. The objects are now grouped together. Any command from the **Tools** menu will work on the area as a unit.

CHAPTER

12 Advanced Tools

Layers

Adding different layers to a drawing allows you to break it up into logical sections. A drawing of a house for example might be broken into structural, electrical, and plumbing layers. Each layer could then be shown or plotted by itself or together with any other selected layers.

Each window on the desktop can show a different layer display. In the house example one window might show just the plumbing layer while another displays all three.

There are 250 layers available for each drawing. The layers are numbered like the cells of a spreadsheet. There are 10 layers per letter for the letters A thru Y. So the first 10 layers are labeled A0 thru A9 and the next 10 are B0 thru B9 and so on. This is shown in the different layer requestors as a grid with the letters running along the top as column names and the numbers running vertically as row names.

As objects are made they are assigned the currently active layer number. The default layer is A0. To change the active layer you use the **Layer** command and select the desired layer from the grid.

To control the layers being displayed use the **Layers Shown** command and mark all the desired layers in the grid.

Layer

To change the current active layer:

- Select **Layer** from the **Preferences** menu. A requestor will appear with the layer grid. You can only select a layer that is displayed in the current window.
- Choose the layer you want by clicking in the cell made by the intersection of its letter and number. For example, the first cell is A0 in the extreme upper left corner.
- When the layer you want is active choose the **OK** button to exit the requestor. To leave without saving any changes use the **Cancel** button.

Layers Shown

To change the displayed layers in the current window:

- Select **Layers Shown** from the **Display** menu. A requestor will appear with the layer grid.
- The cells of the grid act as on/off switches. If a grid cell is dark that layer is active, to turn it off click on it. The cell will change to unshaded. To turn a layer on click on it.
- When the layer grid reflects the layers you want active choose the **OK** button to exit the requestor. To exit without saving any changes use the **Cancel** button.

Data Snap

The **Data Snap** function is a smart feature of Draw. When turned on it tries to guess what you want in the way of connecting lines.

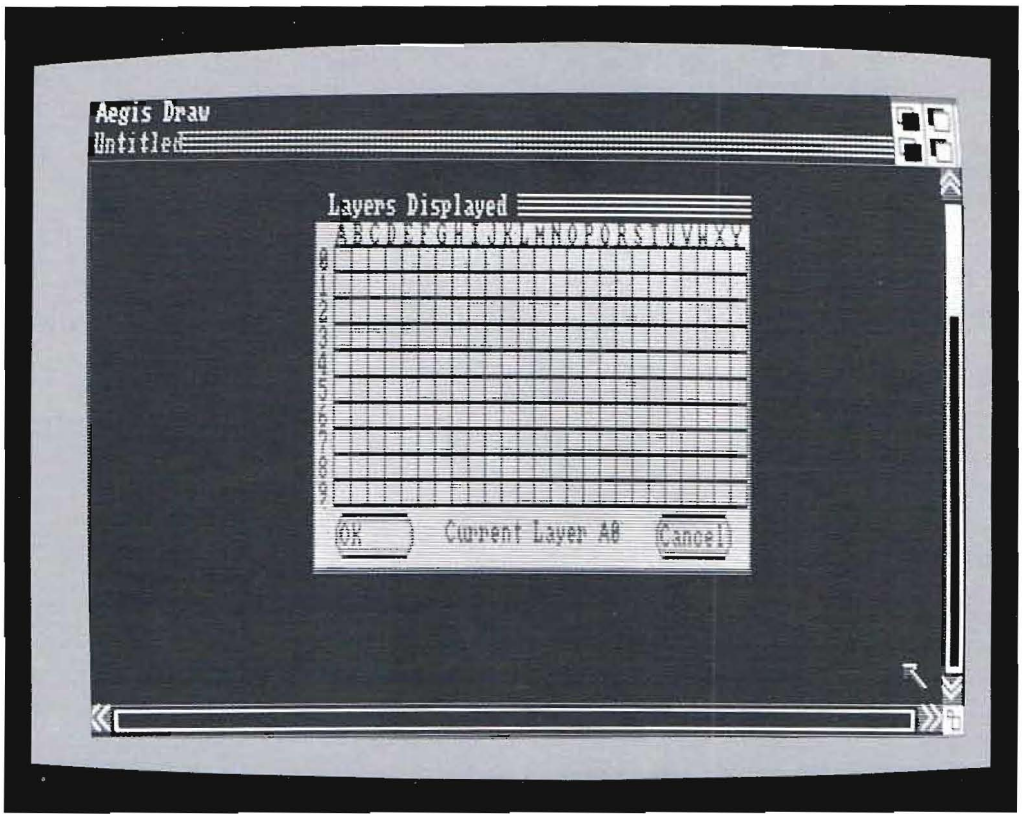


Figure 12.1 Using the Layer Requestor. *Aegis Draw allows you to split a drawing into different layers. As objects are created they are assigned to the currently active layer. Specific layers may be selected for display or printing. The default setting is for all layers displayed. There are 250 layers available. They are named like the cells of a spreadsheet with the first being A0 and the next A1. The "A" series continues through A9 and then "B" starts with B0. All of the layers are displayed on the layer requestor with the letters across the top and the numbers down the side. The intersecting cell of a letter and a number is the switch for that layer. With the* **Layer** *command you may select the currently active layer. When the requestor appears place the cursor on the layer you want active and press the Selection button. The square will darken to indicate selection. To choose which layers will be displayed use the* **Layers Shown** *command under the* **Display** *menu. When the requestor is displayed click in the cells of the layers you want shown. The switch works both ways. To turn a layer off just click on it.*

For example, if you create a line with it turned on Draw will look at either end of the line to see if there is another line in the area. If there is, Draw will assume you want the the two lines to actually touch and will connect or "snap" the lines together.

If the distance between the two lines is greater than 4 pixels horizontally and 2 pixels vertically, Draw will assume you don't want the lines to connect.

If **Grid Snap** is turned on **Data Snap** will be ignored.

To turn Data Snap on or off:

- Select **Data Snap** from the **Preferences** menu. A sub-menu box will open to the right with the two on/off options.
- Move the cursor until the option you want is highlighted and release the button.

Rounding

The **Rounding** function lets you specify the precision of the drawing. For example you might want a building to be accurate to 1/100 of your units in the drawing. If a value of .01 was used for rounding all of the coordinates would be rounded to this value. A coordinate of 22.245 would round to 22.25. You can use this as a way of setting the number of digits of precision, or to prevent odd values from showing up in dimensions.

To adjust the rounding of fractions:

- Select **Rounding** from the **Preferences** menu.
- A requestor will prompt you for the current rounding value. Enter the value and press RETURN or select the **OK** button. To exit without changing the current rounding select the **Cancel** button.

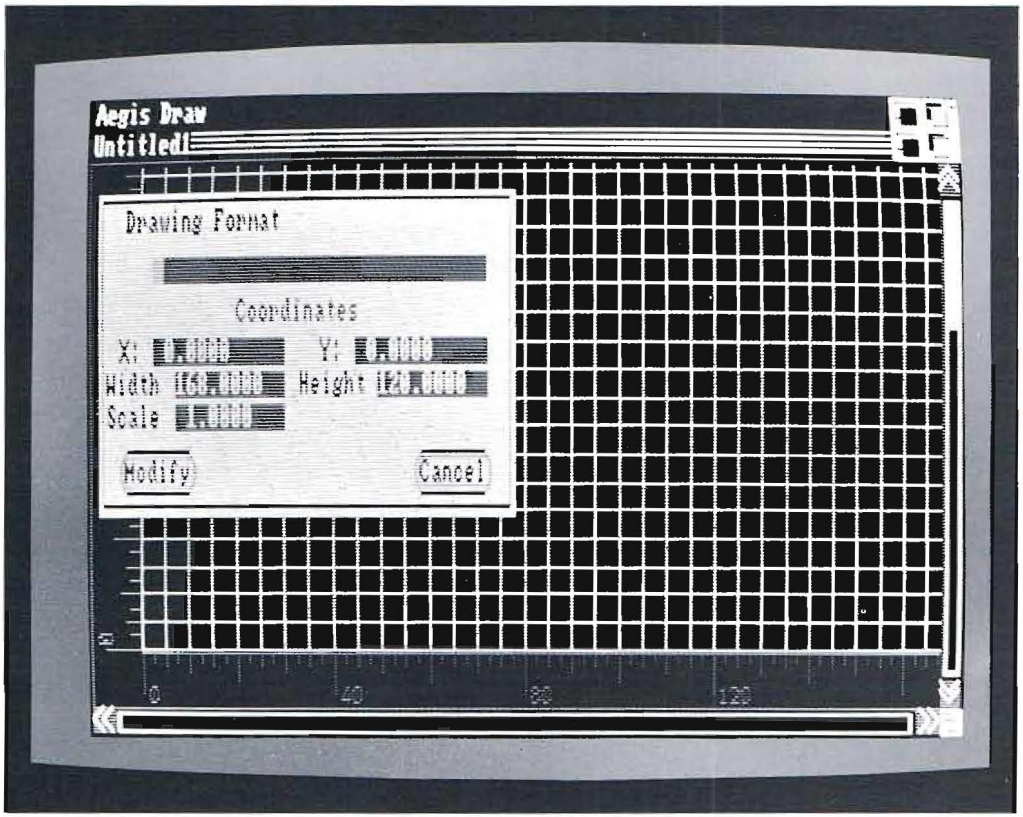


Figure 12.2 Using the Format Requestor. *The* **Format** *command allows definition of a drawing's height, width and origin in respect to both paper and the computer. The* **Height** *and* **Width** *of the drawing refer to the numbers shown on the rulers. These are the maximum values the drawing can scroll to. The* **Origin** *of the drawing is the starting point. Its values refer to the minimum values of the drawing. They are located in the bottom left of a full display drawing. The origin of a drawing may be any positive or negative value and can be changed at any time. The* **Height** *and* **Width** *of the paper refer to the plotter or printer. For plotters, the values define the actual paper size the plotter has to work with. For printers, it controls the size of the printout vertically and horizontally.* **Aspect** *is for plotters only and controls which way the plot will be placed on the paper. To control the aspect for a printer use the Preferences program.*

Smoothing

Smoothing is one of the more powerful functions available in Aegis Draw. Also known as curve fitting, it allows you to create curves with the straight line tools. When **Smoothing** is turned on the points of a shape are fitted into the best possible curve. For example, a connected series of up and down lines in a row would appear as a sine wave with **Smoothing**.

To turn the Smoothing function on or off:

- Select **Smoothing** from the **Preferences** menu. A sub-menu box will open to the right with the **On/Off** options.
- Move the cursor until the option you want is highlighted and release the Menu button.

Format

The **Format** option gives you control of a drawing's width, height, and paper size. It also sets the origin of a drawing. This is the x and y number combination in the lower left corner of a full display. They are the smallest numbers to appear on the rulers. The origin can be set to any positive or negative value. The rulers will adjust themselves according to the origin and the units you have specified with the **Units** command. You may change the origin of a drawing at any time.

The paper size (width and height) tells Draw the size of your plotter. It may also be used to adjust the print area on a printer. The **Format** requestor also has two edit boxes for paper origin. This tells Draw where in a drawing you want the plot to start. The lower left corner of the paper will be set to the x,y ruler location indicated here. This allows you to plot sections of a drawing. To print sections of a drawing with a printer, adjust the view in the active window until it displays the print you want. The **Print** command sends the current view to the printer.

Below the **Paper Origin** edit boxes are two buttons controlling the paper aspect. This command is for plotters only. It adjusts whether the plot will appear on the paper horizontally or vertically. To adjust the vertical, horizontal aspect for a printer use the Preferences section of the Workbench.

To adjust the output formats for a drawing:

- Select **Format** from the **Options** menu. The **Format** requestor will be presented.
- Enter the desired changes directly in the edit boxes (click on a box to select it, then enter new values from the keyboard).
- When the values are set properly select the **OK** button to exit the requestor. Use the **Cancel** button to exit without saving any changes.

CHAPTER

13 The Parts Library

One of the great features of Aegis Draw is its ability to create parts. A part is a collection of objects (lines, text, circles, dimension lines, etc.) grouped together to form an independent object. The part can then be used in the drawing instead of having to recreate it each time. A part may also be saved to disk for use in other drawings.

You can build a library of commonly used symbols for use in all of your drawings. Once a part has been loaded into a drawing it's in stock for that drawing. If you are sending a Draw file to another Draw user you don't have to worry about sending the part file since Draw will already have it included inside the drawing.

Creating, saving, and using parts are all detailed in this chapter and also under the respective individual menu commands.

Using Parts

Parts are best used for repetitious tasks like chips in circuit board design or doors and windows in architecture. They take up a little more memory than just the individual objects that comprise them so it's better memory management to use them only when they will be repeated. Each part made after the first one saves space. In the case of a complicated part involving several complicated objects, the memory savings can be dramatic.

Draw remembers the size of a part even if it has been saved to disk and is brought into another drawing. It is possible to attempt using a part that is too large for the area you are working in. Solutions to this problem are zooming out to a level where the part will fit and then resizing it, or opening another larger window (separate drawing), resizing the part there and using **Cut** and **Paste** to move into the current drawing.

Creating a Part

Parts are created with the **Group** command detailed in Chapter 11. Once created they may be called up for use in a drawing with the use of the **Part** command under the **Tools** menu.

To group objects together to create a part:

- Select **Group** from the **Edit** menu.
- Place the cursor on one side of the area to make into a part and press the Selection button.
- Move the cursor to the opposite corner of the area. A frame will appear around the area. Make sure all the objects are enclosed by the selection frame.

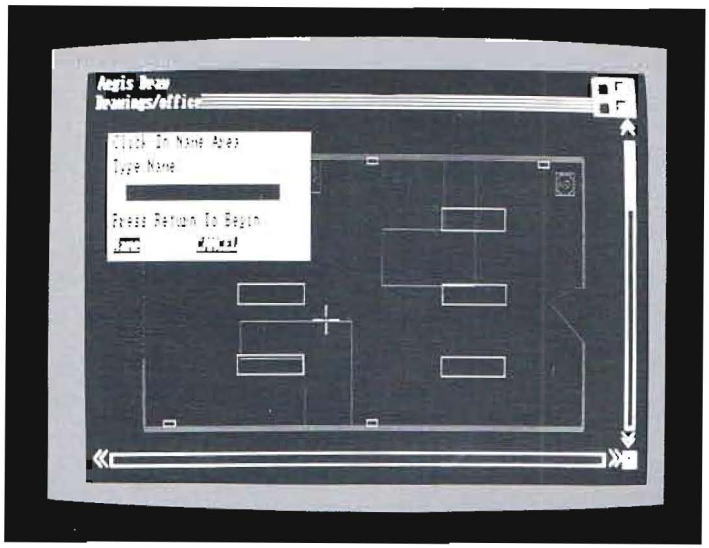


Figure 13.1 Naming a Part. *Parts allow you to group objects together so they may be treated by Draw as a single item. This is done with the* **Group** *command under the* **Edit** *menu. Once the objects have been chosen with a selection frame they are given a name. Each part must have a unique name. Once named the part may be used by selecting it with the* **Part** *command under the* **Tools** *menu.*

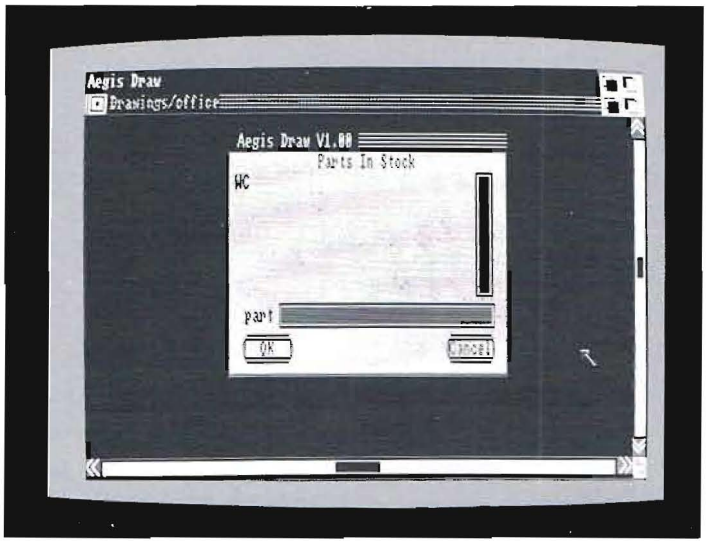


Figure 13.2 The Parts Requestor. *Once a part has been created it may be used like any other object creating tool under the* **Tools** *menu. The parts requestor is presented by selecting the* **Part** *command. The center of the requestor has a scrolling list of all the parts in the drawing. To use a part, click on its name in the scrolling list or enter it directly in the edit box labeled,* **Part**. *If there are no parts in the drawing selecting the* **Part** *command will have no effect.*

- When the frame is correct press the Selection button again. A requestor will appear with an edit box for the name of the part. To exit with no grouping performed select the **Cancel** button.

- Click in the edit box to select it. When the flashing cursor appears in the edit box use the keyboard to type in the name of the part.

- When the name is correct press RETURN or click on the **Name** command. The objects are now grouped together. Any command from the **Tools** menu will work on the area as a unit.

Calling Up a Part

Once created, parts may be used repeatedly in a drawing by calling them up with the **Parts** requestor. After the part has been selected it can be put down as many times as you need. The **Part** command works like the **Line** command or any of the other tools: as long as it is selected, Draw is creating the chosen part.

To place a part in the drawing:

- Select **Part** from the **Tools** menu. If the drawing has no parts "In Stock", you will get the message **Drawing has no parts**. You can create a part with the **Group** function in the **Edit** menu, or use the **Open Part** function in the **Project** menu.

- If the drawing does have parts, a window will appear listing the "Parts In Stock" for that drawing. Click on the part you want to use. You can also type the name of the part in the edit field, by clicking in the box titled **Part** and typing in the name of the part. When the part name is correct press RETURN or select the **OK** button. If the part you have chosen cannot be found in the drawing, you will get the message **Can't Find The Part**. Select a new part by repeating the steps above.

- Once you have selected a part, click the selection button on the drawing. A rectangle representing the part will appear attached to the cursor. Drag the rectangle to where the part should be placed and press the Selection button to put the part down.

Exploding a Part

Explode breaks a part back into its component objects. This allows editing of a part. If the objects are changed in the part a new grouping must be performed to save the new part. The old part will still be in stock.

To break a part back into its sub-components:

- Select **Explode** from the **Tools** menu.
- Choose the part to explode. A frame will appear around it to indicate it is selected.
- Press the Selection button again to accept the choice. The individual elements of the part are now as they were before the **Group** command was issued. To cancel the command press the Menu button.

Storing a Part on Disk

To use a part in other drawings it must first be saved to disk. The part must already have been made with the **Group** command before selecting **Save**.

Draw keeps a parts directory on disk, but it is not required that parts be stored in the directory. To save the part to another directory just change the name in the directory edit box of the storage requestor.

To save a part to disk:

- Select **Save As** from the **Project** menu. A sub-menu box will open to the right with the different file types..
- Move the cursor until **Part** is highlighted and release the Menu button. The Parts In Stock requestor will be displayed.
- Choose the part to save from the list by clicking on it. The name will be entered into the **Part** edit box. If you change the name of the part, Draw will not find it in the list and will cancel the action.
- When you have the part you want select the **OK** button. To back out of the operation select **Cancel**.
- The storage requestor will be displayed next. Details on using this requestor may be found in Chapter 14. If you wish to save the part into a directory other than Parts, click in the **Drawer** edit box and change the name to the proper directory. Leaving this area blank will direct the file to the current directory.
- You may change the name of the part at this time. To do this click in the **File** edit box. When the name and directory are correct choose the **OK** button. To exit the requestor without saving the part use the **Cancel** button.

Loading a Part from Disk

Parts that have been saved to disk from other drawings may be loaded into a drawing with the use of the **Open** command. If a part is larger then the current Drawing, you may not be able to use it.

Once the part is loaded into the drawing it's added to the list of Parts In Stock. To use the part go to the **Part** command and select it from the requestor.

To load a part from disk:

- Select **Open** from the **Project** menu. A sub-menu box will open to the right displaying the different file types.

- Move the cursor until **Part** is highlighted and release the Menu button. The storage requestor will appear. Details on using this requestor may be found in Chapter 14.

- If the part you want is not in the Parts directory, click in the **Drawer** edit box to select it and change the name to the correct directory. Leaving the box blank will activate the current directory. Press RETURN to see a list of files in the new directory.

- Choose the part you want by clicking on it. The name will be entered into the **File** edit box. Alternatively you may enter the name of the part into the edit box directly.

- When the directory and part name are correct select the **OK** button. To abort the loading use the **Cancel** button.

- After the file is loaded you will be returned to the drawing with the current active tool. Use the **Part** command to access the newly loaded part.

CHAPTER

14 Storage

The Storage Requestor

All file handling is done through a window called the Storage Requestor. From here you can view the files on disk, switch directories, and open or close a file.

There are two edit boxes for entering file and directory information. The edit box on top, labeled **Drawer**, is for changing directories. You can gain access to a directory or disk by entering the name here followed by a RETURN. The edit box on the bottom, labeled **File**, is the name of the file you wish to load or save.

Directly below the drawer box is a list of files in the current directory. To the right is a slider gadget for scrolling through the files. By dragging the black marker up and down you can scroll the file list.

A shortcut for loading a file or switching directories is available by clicking on a name in the file list. If the name is a directory it will be loaded into the **Drawer** edit box otherwise it will be loaded into the **File** edit box.

The **OK** and **Cancel** buttons are for completing the request (OK) or backing out without loading or saving (Cancel).

Saving to Disk

Drawing

Drawings are kept in a directory named "Drawings". It is not required for drawings to be saved here. To save a drawing to a different directory just change the name in the **Drawer** edit box.

To save the drawing in the current window to disk:

- Select **Save As** from the **Project** menu. A sub-menu box will open to the right with the different types of files you can save.
- Move the cursor until the option **Drawing** is highlighted and release the Menu button.
- Place the cursor in the **File** edit box and press the Selection button. This is where you enter the name to give the drawing. There are two ways to enter data here: by choosing one of the names from the scrolling file list or by typing the data in. To type the data in use the arrow keys to move the cursor beyond any data already displayed and then backspace to remove what you don't want. Now type in the new name. To enter a name from the list just click on it. Saving to the exact same name will destroy any data in that file and replace it with the drawing you are saving.
- When the name is complete press the **OK** button.

Part

Draw keeps a parts directory on disk. It is not required that parts be stored in the directory. To save the part to another directory just change the name in the directory edit box of the storage requestor.

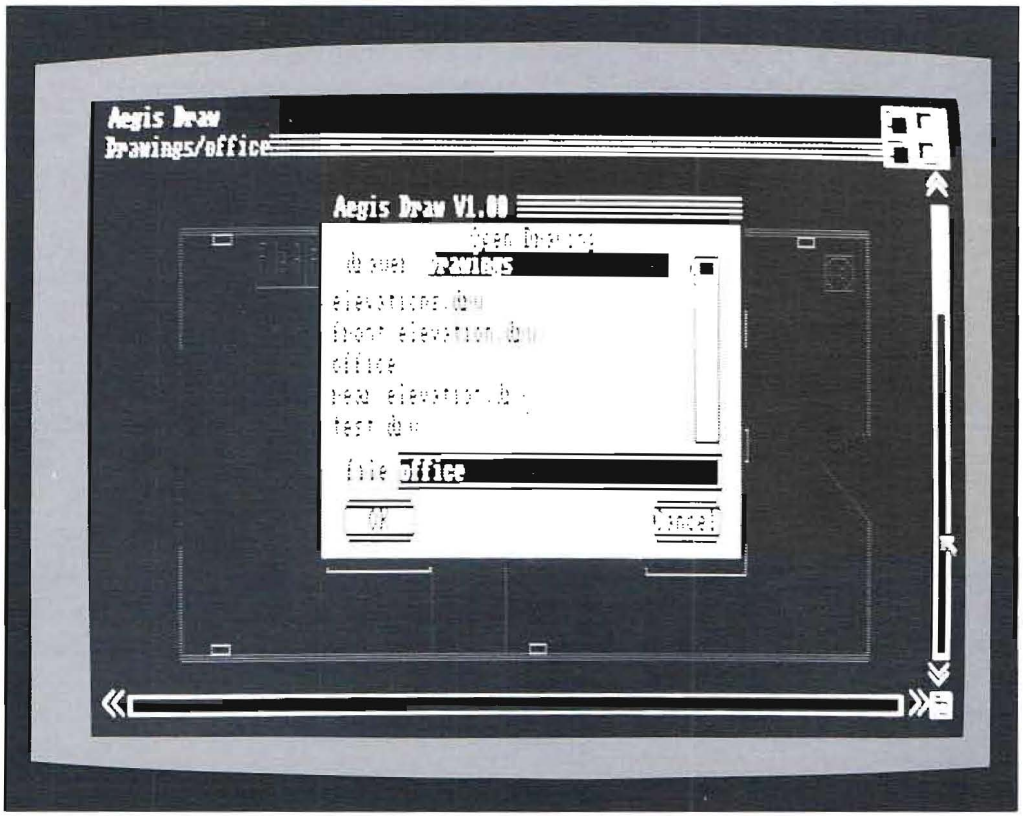


Figure 14.1 The Storage Requestor. *To load drawings into Draw or save them to disk requires use of the storage requestor. Draw can save drawings, parts, and bitmaps (window dumps in IFF). Drawings and parts can be loaded into the program. On the Draw disk are directories already set up for your use. Drawings are kept in one and parts in another. This is not a requirement of the program, only a convenience. Since Aegis Draw does not require file extensions to determine a file type it is easier to separate them with directories. The requestor is a multi-tasking tool. As you use it the disk is being read and the files sorted and displayed in the scrolling list. This is why the list may seem to change constantly. You may choose a different directory by entering its name in the edit box at the top. Press RETURN when the name is correct and the files in that directory will be displayed in the list. To select a file, click on it in the scrolling list or enter the name directly in the edit box at the bottom. Pressing RETURN afterward will have the same effect as choosing the* **OK** *button.*

To save a part to disk:

- Select **Save As** from the **Project** menu. A sub-menu box will open to the right with the different file types.
- Move the cursor until **Part** is highlighted and release the Menu button. The Parts In Stock requestor will be displayed.
- Choose the part to save from the list by clicking on it. The name will be entered into the **Part** edit box. If you change the name of the part Draw will not find it in the list and will cancel the action.
- When you have the part you want select the **OK** button. To back out of the operation select **Cancel**.
- The storage requestor will be displayed next. If you wish to save the part into a directory other than Parts click in the **Drawer** edit box and change the name to the proper directory. Leaving this area blank will direct the file to the current directory.
- You may change the name of the part at this time. To do this click in the **File** edit box and enter the new name. When the name and directory are correct choose the **OK** button. To exit the requestor without saving the part use the **Cancel** button.

Bitmap

Bitmaps are pixel representations of drawings that may be loaded into other programs like Aegis Images™. Any program that uses the 640 X 200 resolution mode of the Amiga and supports the IFF (Interchange File Format) file type may use these files.

Draw saves a picture or whatever the current active window is displaying. This includes any level of zoom. The rulers are not included. Grids are optional by turning them on or off with the **Grid On/Off** command under the **Display** menu.

To save a picture of the current window to disk:

- Select **Save As** from the **Project** menu. A sub-menu box will open to the right with the different file types.
- Move the cursor until **Bitmap** is highlighted and release the Menu button.
- The storage requestor will be displayed next. If you wish to save the part into a directory other than the active one click in the **Drawer** edit box and enter the name of the proper directory. Leaving this area blank will direct the file to the current directory.
- Click in the **File** edit box and enter the name of the picture. When the name and directory are correct choose the **OK** button. To exit the requestor without saving the picture use the **Cancel** button.

Loading from Disk

Drawing

When the **Open** command is performed for a drawing Draw will load it into the active window. If there is already a drawing in the window you will be prompted to kill it. Choosing **OK** will erase the window and complete the loading of the new drawing. Selecting **Cancel** will abort the load operation.

To load a drawing into a new window choose the **New Drawing** command under the **Project** menu. The new window will become the active window and any drawings will be loaded into it.

To load a drawing from the disk:

- Select **Open** from the **Project** menu. A sub-menu box will open to the right showing the different options.

- Move the cursor until **Drawing** is highlighted and release the Menu button. The Storage Requestor will be presented.

- If the drawing is in a directory other than Drawings click on the **Drawer** edit box. Type in the name of the directory and press RETURN. The scroll list will change to the new directory.

- Enter the name of the file in the **File** edit box. You may either enter it manually or by clicking on the name in the scrolling file list.

- When the name is correct click on the **OK** button. To abort the operation use the **Cancel** button.

Part

Part files are like drawing files. A part is really just a miniature drawing. They are normally stored in the Parts directory. More detailed information can be found on parts in Chapter 13.

To load a part from disk:

- Select **Open** from the **Project** menu. A sub-menu box will open to the right displaying the different file types.

- Move the cursor until **Part** is highlighted and release the Menu button. The storage requestor will appear.

- If the part you want is not in the Parts directory, click in the **Drawer** edit box to select it and change the name to the correct directory. Leaving the box blank will activate the current directory. Press RETURN to see a list of files in the new directory.

- Choose the part you want by clicking on it. The name will be entered into the **File** edit box. Alternatively you may enter the name of the part into the edit box directly.

- When the directory and part name are correct select the **OK** button. To abort the loading use the **Cancel** button.

- After the file is loaded you will be returned to the drawing with the current active tool. Use the **Part** command to access the newly loaded part.

CHAPTER

15 Output Devices

A drawing may look nice on the screen of your computer, but it won't do you much good at the construction site. Printers and plotters enable Draw to transfer the output of the drawing to paper. Printers reproduce the screen. Plotters have a far higher resolution than most computer displays (typically 1000 units per inch). This means printers will produce stepped lines and other limitations of the screen. A plotter though, will transform a drawing into a clean, easily read plan or diagram. The plotter draws by moving a pen on the paper. There are no dots (pixels to printheads) or staircases, just smooth lines. If you are going to use Draw in your work, we suggest, cajole, and beg you to get a plotter for the job.

There are two commands affecting the output of the drawing; **Format** and **Scale**. **Format** allows you to control the plotter's paper size, origin, and the horizontal/vertical aspect. It is discussed in detail in Chapter 12. **Scale** maps the number of units per inch of output. This is also only for plotters.

Scale

Scale allows you to define a ratio of Draw units to plotter units. For example, if you were using a B size plotter (11″ by 17″ paper) and your drawing was 160 units across by 100 units in height (see **Format**), you might want each inch on the plotter to equal 10 units in the drawing (a scale of 10). A map of an area 100 miles by 100 miles could use a scale of 10 miles to the inch (on the plotter). Aegis Draw doesn't know the units in your drawing are miles, but it does know you want 10 of those units to be mapped to an inch on the plotter.

The scale may be adjusted at any time before a drawing is plotted.

To set the scale of the drawing:

- Select **Set Scale** from the **Options** menu.
- A requestor will appear showing the current scale. Click in the scale edit box and type in the desired scale. Press RETURN or select the **OK** button to accept the change. Use the **Cancel** button to exit without any changes.

Plotting a Drawing

Plotting large drawings can take hours. The Amiga provides a nice solution to that problem. Since it's a multi-tasking computer Draw can put the commands to the plotter in a plot file on disk and direct them to the plotter from there. It takes much less time to write the commands to disk than to execute them on the plotter so Draw can be ready again for use while the plotter is still working. The only catch here is a large drawing would create a large plot file and there may not be enough disk space. If this is the case Draw will inform you and ask if you want to plot directly.

There are two options to plotting; **Scaled** and **Un-Scaled**. A **Scaled** plot will use the current scale in directing the plotter. An **Un-Scaled**. plot will reproduce the view in the active window in its actual size.

Draw plots the current view of the active window. Zooming in will produce a plot of the new view. Scaled plots of sections of a drawing can be made this way. The current view also includes functions like layers and the grid. The active layers and the grid (if it is turned on) will be plotted.

To plot the current view of the active window:

- Turn on the Plotter.
- Select **Plot** from the **Project** menu. A sub-menu will open to the right with the **Scaled/Un-Scaled** options.
- Move the cursor until the option you want is highlighted and release the Menu button.
- The disk drive light will come on. It may take a moment for the file to be written to disk so don't panic if the plotter doesn't start right away. When the file is finished Draw will be ready for use again. You can even work on the drawing being plotted.

Plotters Supported

Draw comes configured for the HPGL™ plotter language. The default **Format** (size of paper, etc.) is set up for the Roland DG DXY-980 plotter. HPGL is the Hewlett Packard Graphics Language, a widely used plotter interface. If you are using the Roland plotter you should switch the plotter to use this interface. Draw does provide a method for supporting virtually any plotter in existence. There is a file titled "Plotter.driver" on your disk containing the information on how to talk to your plotter. You can modify this to support plotters that do

not use HPGL. This file also contains information on the plotter's size and resolution. See Appendix C, Aegis Draw File Types, for more information on modifying the plotter driver.

Your plotter may use a parallel or serial interface. Use the Preferences program, Printer subsection, to set the interface requirements.

Plotter Cabling

Consult your plotter manual to determine what cabling you will need. If you are using the Roland plotter we suggest running it from the parallel printer port of the Amiga. The switch settings for the Roland plotter are:

SW-1: 1-7 off, 8-10 on.

SW-2: 1-6 off, 7-10 on.

If your plotter uses the RS-232 serial port, you will have to get a cable that fits the Amiga properly. We have used a normal ribbon cable with success, but you may need assistance from the plotter documentation. Remember to use the Preferences program to set the printer to the proper port and baud rate.

Printing a Drawing

The results from a printer will not be as clean as a plotter because draw "dumps" the window to the printer. Since Draw doesn't know the size of the printout, **Scale** does not affect the printing. What you see is what you'll get. However, if you take the time to measure the paper, and use **Zoom** to set the view size of the drawing, you can create scaled prints of Draw.

One technique to get more resolution from the printer is to divide the drawing into sections and print them individually. The different

pieces can then be taped together. The easy way to do this is to **Zoom In** to get the desired resolution, and use the scroll controls to move the display to all the sections of the drawing. Hitting the scroll button 3 times will move you over one window's worth.

To print the view of the current window to the printer:

- Select **Print** from the **Project** menu.

Printers Supported

Draw will support any graphics printer present in the Amiga Preferences program. Consult your Amiga manual on how to use the Preferences program.

CHAPTER

16 Problems

Running Out of Memory

A 512K Amiga has quite a bit of memory compared to the 64K computers of a few years ago. Running out of memory would seem to be an unlikely event. However, there are some features of the Amiga that consume large amounts of memory, and can cause Aegis Draw to run out of usable RAM.

The high resolution graphics of the Amiga play a role in memory problems. Each window in Draw can consume more than 64K of memory. When a window is covered by another window or requestor the Amiga operating system "preserves" the covered portion of that window. If there was less than 64K of memory left and a window was covered, you would see a memory problem. Draw prevents you from opening more windows than it considers "safe". If you use more memory (quite a bit more) after you have opened the window, you could still run into problems. If you use the CLI instead of Workbench, you will have more memory to work with.

Draw is also a large program. The program is about 140K in size, and uses additional memory when it first runs, but the drawings do

not use up much memory. Use of the parts feature can help the memory consumption problem if an item is going to be used more than once. The worst memory hog in a drawing is the FreeHand tool. Typical FreeHand items can use a few thousand bytes of memory each. It may be prudent to use a **Line** or **Polygon** tool and the **Smoothing** function to create the curves you need.

The Amiga is a multitasking computer. If another program uses up memory Draw will be affected. If you are going to run another program at the same time as Draw, it may be wise to limit yourself to one window unless you have added expansion RAM beyond 512K (a very good idea).

When you are low on memory Draw will inform you by posting a message on the screen. Draw will also close any windows created with the **Zoom Window** menu. This frees up memory without throwing away any drawings. If you are low on memory and have more than one drawing on the screen, closing one of the windows will free up quite a bit of that memory.

You can monitor your memory consumption by using the **About** function in the **Project** menu. There should be more than 64K of CHIP memory available. There will be no FAST memory left unless you have added expansion RAM beyond 512K. Draw still needs the CHIP memory even if you have a large amount of FAST memory in your Amiga. The CHIP memory is used by the Amiga to store the covered portions of windows. If you do have FAST memory added to your Amiga, you will have more CHIP memory for windows. The Draw program and the drawings will load into FAST memory. This allows you to create more detailed drawings since they can use the FAST memory. More CHIP memory is left over for windows. Draw will let you open more windows if it sees more CHIP memory available.

There are other indications you are running out of memory. If you execute a function that modifies a drawing (**Edit** menu, **Paste**, **Modify** items), and get a message there isn't enough free memory to allow

you to UNDO from this operation, you are low on memory. If you attempt to **Save as** or **Open**, and are informed there isn't enough memory to open the requestor, you are low on memory. Draw attempts to monitor the situation as best it can, but you should be aware of the memory problems that can occur.

Out of Memory, Saving Your Work

If you decide to save a drawing after you have been informed of the memory problems, you should be able to use the **Save As** menu item. Just follow the procedure as outlined in Chapter 14. If you are really low on memory and cannot use the **Save As** menu item then the **Save** function is the only solution. Make a habit of saving your work often. This can prevent real problems from occuring. It will also give the drawing a proper title, so **Save** will save it to the proper file name (as opposed to Untitled).

If you have created parts, they will be saved along with the rest of the drawing. If you run out of space on the disk, Draw will inform you a problem has occured. You can use another drive or even swap the disk out of the internal drive (WAIT FOR THE DRIVE LIGHT TO GO OUT!). A good rule of thumb is to save the data often as you would not want to redo your work. If you don't want to redo more than 1 hour of work, save every hour. On a multitasking computer you can never have too much memory.

Using the Reference Section

If you have a problem with a menu item or function, use the index to refer to the chapter that talks about that function. Many problems are a result of not understanding the use of a tool. The manual can be a great way of preventing problems.

Also the Table of Contents is a good, fast method of looking up a command. In the back of the book is an appendix, Aegis Draw Menus.

This is a menu by menu listing of all the commands with a page reference for each.

Don't Panic!

If you get an area of difficulty with Draw, don't panic. If you think you have seen a bug, check the manual first to see if you are using the tool correctly. If it isn't described in the documentation, write down the circumstances and get in touch with us. We'll attempt to fix every problem that comes up, but we won't be able to unless you give us the clues we need. Draw has been tested for months, but there's always the chance we overlooked something somewhere.

If there is a feature you MUST HAVE, let us know. It may be something that can help other users. Write us with your suggestions, comments, and experiences with Draw. We may use this in the design of future products. We may be able to find a "workaround" to the problem. Anyway we will try to be as helpful as possible.

SECTION

4

BEYOND AEGIS DRAW

CHAPTER

17 Using Genlock

One of the great advantages of the Amiga is its ability to interface with video equipment. A notable tool developed by Commodore for use in this area is the Amiga 1300 Genlock System. This system allows users to simultaneously produce video and stereo signals while running programs on their computer. The signals can come from a VCR, lazer disk, video tape, or other computer. Not only can the signals and program be produced on the machine together but the combination can be recorded on another device.

The video signal produced by the Genlock is displayed in the background color (color zero). All other colors display over the top of it. The video out portion of the Genlock can switch from the Amiga signal to the video signal or produce both at the same time.

There are a number of creative possibilities opened with the combination of Aegis Draw and Genlock on an Amiga. One of the most interesting is the ability to shoot an already existing drawing with a video camera and pipe the signal into the Amiga with Genlock. By changing the windows background color in Draw to zero (upper-left color in the **Color** menu) the drawing will appear in the window. It can then be traced with the Draw tools by drawing on top of the image.

Presentations to prospective clients can be created by capturing images of a real world project and combining them with computer generated diagrams. With the same device background music can be added to produce professional effects at a fraction of the cost.

The Amiga 1300 Genlock system is available through authorized Commodore dealers.

CHAPTER

18 Using Aegis Draw Data

Exporting Data to Other Applications:

The images created by Draw can be used in other applications. Bitmaps can be passed to any application supporting IFF (640 by 200 resolution). Aegis Images (high resolution) is an example, as well as other paint systems from other publishers.

If you are a programmer, source code for dealing with IFF bitmaps is available from Commodore and is posted on several BBS's, Compuserve™, and BIX™. You could use Draw to create scenes for an Adventure game. In a more serious vein, you could create software that controls the lights and alarm in a house, and use the Draw program to create the layout of the house.

The file format of Draw is detailed in Appendix C. If you want to deal with the drawing itself you can read this file directly. Draw uses ASCII files and has a "clean" file format. However, Draw generates most of the graphics in the program itself. For example a dimension is stored as (basically) two points. When Draw displays the dimension it calculates the distance, generates the text, and draws all the lines that make up the dimension. This may be difficult to accomplish in

your own program. Other elements that are complicated to display include Text, Smoothed Lines, Arcs, and Parts.

If you want to generate Draw data, items like Lines, and Polygons are quite easy to create. You could plot functions by writing programs to create the lines in Draw file format. Once loaded into Draw, you could add text and patterns. This would allow you to get plotted results of your efforts. A function plotter program that interfaced with Draw might be a good product to sell as an add-on to Draw.

It is still possible to write software that generates parts lists displays lines, polygons and circles, and deals with the drawing file directly. If you want to display the drawing there is another method that works quite well. When you **Plot** a drawing, Draw creates a file titled "PLOTFILE" containing the commands for your plotter. This "plot file" is quite simple, consisting of Draw, Move, Color, and Pattern commands in ASCII format. You could read this file and display the plot file yourself.

Preparing for Pro Draw

In the near future you will receive (you did send in your registration card?) an offer to upgrade to Aegis Pro Draw. You will be able to upgrade for less than the difference in price between Pro Draw and Draw. Pro Draw adds the professional features you'd expect on a mini-computer based CAD system.

There will be a file translator that will convert Draw files to Pro Draw files. The work you create in Draw will be usable in Pro Draw. Some of the additional features in Pro Draw are:

1. User Defined Menus.

2. Interfaces to programming language.

3. Attributes.

The best way you can prepare for Pro Draw is to take advantage of the **Part** feature of Draw. In Pro Draw parts can be assigned attributes. These attributes can be anything you want. You could keep track of cost, shipper, material, weight, whatever. By using parts in Draw, you'll prepare your drawings for use in Pro Draw.

CHAPTER

19 Getting the Most Out of Your Amiga

Hardware Pitfalls to Avoid

The Amiga is a high powered personal graphics workstation. As with any high performance product there are certain things to be aware of. These include the quality of the display monitor, expansion memory, and mass storage devices. In order for Draw to be a useful tool, you'll need the proper hardware. Here is a brief list of the MINIMUM requirements.

1. Amiga 1000 Computer.

2. 512K of RAM memory.

3. Color Analog RGB monitor.

With this hardware you will be able to run Draw. In order to get the maximum benefit from Draw the following are HIGHLY recommended.

1. Expansion memory beyond 512K (1 or 2 Meg expansion cards). Draw has been successfully run on the Tecmar 1Meg

expansion card. You MUST still have 512K of internal RAM in the Amiga.

2. Amiga external 3.5″ floppy drive. It helps you make backups and gives you more disk space for drawings and parts.

3. High quality RGB Analog monitor. We recommend a Sony KV1311CR for Draw and for Pro Draw a high persistence monitor (Electrochrome, Mitisibusi LP series, etc.). A good monitor will make your work pleasurable. A bad one can be torture.

4. Hard Disk. Draw has been successfully run on the Tecmar 20 Meg Drive. One of the most important features of a drive is the ability to recover from a "crash" of software/hardware on the Amiga. You should ask that the software supplied for the hard disk have a "Re-Verification" function. The "Re-Verification" or "Auto-Verification" of a drive rebuilds the directory. The other concern is the amount of memory the drive uses. If you have a 512K Amiga, a drive that uses 50K of RAM for it's software can prevent you from running large applications. Of course, if you have expansion RAM this isn't a big deal.

5. Plotter. Draw looks good on the screen or a printer, but the plots look great! The Roland DXY 980 is an excellent plotter (up to 11″ to 17″ paper). If you want to use another plotter with Draw, try to get one that supports the HPGL plotter language. You can configure Draw for ANY plotter, but this does involve some work.

6. Real time clock. A-Time™ is a battery backed up clock that will allow your Amiga to have the correct time. This will allow you to determine the correct date a file was last created/modified. Very useful for keeping track of revisions. A real time clock prevents you from having to type in the time every time you reset or power up your Amiga.

If the electrical power in your area is less than dependable, consider purchasing a line filter. For severe conditions (power outages, brown outs) a battery backed up power supply is a useful accessory. This can prevent hard disk crashes. You will have time to save your drawings before the battery runs down.

Follow the instructions for setting up your Amiga. Make backups of all your software before using it. If you have purchased any additional hardware, you should read the documentation before installing it. This may sound like common sense, but it can prevent problems from appearing.

CLI vs the Workbench

The workbench is a program that gives the user a graphical, icon-like interface to the Amiga operating system. Workbench is easy to use. Draw will work under Workbench without problems. Why would you use CLI? There is one reason, memory. Workbench uses an additional 40K of memory. CLI uses less memory and is very flexible. We've included a brief tutorial in the use of CLI. Once you get familiar with your Amiga, CLI will become a useful way of "talking" to your Amiga.

Printers, Plotters and Pens

Printers are reliable output devices. Draw will support any graphics printer appearing on the Amiga Preferences menu of printers. There are several color printers that will work with the Amiga. The Okimate 20 is a low cost color printer that uses a thermal transfer method of color printing. Colored "wax" is melted off the ribbon and adheres to the paper. The Epson JX80 is a conventional impact printer using a multicolor ribbon. The Diablo C150 is a color ink jet printer. Colored ink is sprayed on the paper directly. Ink Jet printers are quiet and produce excellent output.

A plotter will provide the best quality output from Draw. Plotters are also reliable devices. Since most people are not familiar with plotters a few words to the wise on maintenance. Pens need to be capped after use. Some plotters support the use of mechanical drafting pens, these can be refilled with ink. The mechanical pen's tips need to be cleaned quite often. Felt tip pens will do for most applications. Some plotters will cap their pens automatically, most notably the Epson HI 80. Draw will only produce the number of colors the plotter can produce (Pro Draw will allow you to manually change pens).

When transporting plotters, be sure to protect the mechanism that moves the pen. This is one area where plotters are more fragile than printers. A spare set of pens is also a good idea. There are also pens for plotting on transparencies. You could use Draw to create diagrams on transparencies, for presentations and lectures.

SECTION

5

APPENDICES

APPENDIX

A Aegis Draw Menus

This appendix contains a listing of all the menus in their order of appearance (left to right) in the program with a brief description of each and page references to other material.

Project

New Drawing	Opens a new window for drawing.
Open	
Drawing	Loads a drawing stored on disk into the current window 14-5
Part	Loads a part stored on disk into the current drawing 14-6
Save	Saves the current drawing to disk under the current file name.
Save As	
Drawing	Saves the current drawing to disk and requests a file name 14-2
Part	Separates a part from a drawing and saves it to disk 14-2
Bitmap	Saves the current view in the current window to disk as an IFF file 14-4

Plot	Sends the current drawing to the plotter	15-3
Print	Sends the current view of the current window to the printer	15-4
Kill Drawing	Deletes the current drawing from memory.	
Quit	Exits the Aegis Draw program.	
About Draw	Displays an information screen about Draw. Also displays the current memory usage for Draw.	

Edit

Undo	Removes the last action from a drawing	11-2
Cut	Removes an area of a drawing and moves it to the clipboard	11-2
Copy	Copies an area of a drawing to the clipboard	11-4
Paste	Places the contents of the clipboard in a drawing	11-4
Erase	Erases all of the objects in an area	11-4
Modify		
Size	Changes the size of all of the objects in an area	11-5
Rotate	Rotates all of the objects in an area	11-6
Distort	Changes the height/width aspect of an area and allows "flipping" to create a mirror image	11-7
Paint	Changes the color of all of the objects in an area	11-8
Pattern	Changes the line pattern of outlined objects and the fill pattern of filled objects in an area	11-9
Weight	Changes the line weight of all of the objects in an area	11-9
Group	Groups all of the objects in an area together as a part	11-10

Tools

Line	Sets the Draw tool to creating lines	9-2
Rectangle	Sets the Draw tool to creating rectangles	9-2
Polygon	Sets the Draw tool to creating polygons	9-3
Freehand	Sets the Draw tool to creating freehand shapes	9-3
Arc	Sets the Draw tool to creating arcs	9-3
Circle	Sets the Draw tool to creating circles	9-4
Text	Sets the Draw tool to creating text labels	9-4
Dimension	Sets the Draw tool to creating dimension lines	9-5
Part	Sets the Draw tool to creating one of the parts from the parts requestor	9-6
Drag It	Sets the Draw tool to moving objects	10-2
Rotater	Sets the Draw tool to rotating objects	10-2
Clone	Sets the Draw tool to making copies of objects	10-3
Eraser	Sets the Draw tool to erasing objects	10-4
Explode	Breaks a part back into its component objects	10-4
Sizer	Sets the Draw tool to changing the size of objects	10-4
Back	Moves objects to the front of the drawing list. If an object is drawn first it will be "behind" other objects	10-5
Color	Sets the Draw tool to changing the color, line pattern and weight, and fill pattern of objects	10-6
Stats	Allows you to adjust the position and other aspects of objects from the keyboard	10-6

Display

Zoom

In	Magnifies the view in the current window to display a selected area	7-9
Out	Increases the display area in the current window by 2 times ("backing out" of a Zoom)	7-9

Window	Creates a new window if possible with a magnified view of the selected area	7-10
Full Display	Returns the view in the current window to the full view of the drawing after zooming in	7-10
Grid On/Off	Turns the grid on or off in the current window	7-4
Rulers On/Off	Turns the rulers on or off in the current window	7-7
Crosshairs On/Off	Turns the crosshairs on or off in the current window	7-11
Set Color		
Grid	Changes the color of the grid in the current window to the active color	7-8
Background	Changes the background color of the current window to the active color	7-7
Rulers	Changes the color of the rulers in the current window to the active color	7-8
Repaint Grid	Does a quick repaint of the grid without refreshing the entire drawing	7-6
Layers Shown	Selects the layers to be displayed in the current window	12-2

Options

Line Pattern	Selects the active line type (solid thru dotted)	8-4
Line Weight	Selects the active line thickness	8-4
Fill Pattern	Selects the active pattern for creating filled objects	8-5
Grid Size	Sets the distance between grid lines	7-5
Grid Pattern	Sets the lines of the grid to one of the available line patterns	7-4
Units	Selects the type of units to be used in the rulers	7-7
Set Scale	Sets the scale for output to the plotter	15-2
Set Rounding	Selects the level of precision for the drawing.	

Format	Sets a drawings height, width, and origin. Also the paper height, width, and origin	12-6

Preferences

Layer	Selects the active layer	12-2
Filled		
On	When **Filled** is turned on all objects created will be filled with the current fill pattern	8-4
Off	When turned off all objects will be outline.	
Numeric Display		
On	Turns on numeric display of the cursor position.	
Off	Turns off the display	7-11
Grid Snap		
On	Forces objects created to "snap" to the nearest grid intersection.	
Off	Disables **Grid Snap**	7-5
Data Snap		
On	Attaches objects created to others in the immediate area.	
Off	Disables **Data Snap**	12-2
Rounding		
On	Enables the precision level fixed with the **Set Rounding** command.	
Off	Disables the precision level	12-4
Smoothing		
On	Performs curve fitting on straight line objects when created.	
Off	Disables curve fitting	12-6

Color

Modify Colors	Allows you to change the hue of any color in the palette	8-2

APPENDIX

B Hardware Requirements

Aegis Draw runs on a 512K Amiga with one 3.25″ disk drive. We recommend using more equipment however if you intend serious work.

A minimum system would include:

512K Amiga
1 External Floppy Drive
1 Plotter (eg. Roland DXY 980)

A recommended professional system:

512K Amiga
20 Megabyte Hard Drive (eg. Microforge)
1 Megabyte Ram Expansion Card
1 High Performance Color RGB Monitor (eg. Sony KV1311ER)
1 Plotter

Other Options:

GenLock
Live! Video Digitizer
Kurta Digitizing Input Pad (eg. Penmouse(TM))
Color Video Camera
Beta or VHS VCR
68020 Processor Chip

APPENDIX

C Aegis Draw File Format

The Aegis Draw files for Drawings and Parts are "normal" ASCII files. These text files can be edited with any Amiga text editor (ED for example). Drawing and Part files can be read by almost any programming language. Draw uses ASCII files to allow for easy interface to other programs. Draw will also be expanded into Aegis Pro Draw. ASCII file format makes translating these files simpler.

ASCII files consist of text. Draw uses only 3 "types" of text. These are the following:

1. Integer: a whole number of the form "123" (the quotes do not appear in the file). This is translated into a 32 bit value by Draw. Integers consist of the digits 0 thru 9, followed by a trailing space or linefeed. Integers are used to hold values like color, pattern, weight, and layer.

2. Real Number: a floating point value of the form "122.22" (the quotes do not appear in the file). This is followed by a space or linefeed. Real numbers consist of the digits 0 thru 9, with an (optional) decimal point ".". Real numbers are used for coordinates, sizes, and angles. Draw uses ASCII

to represent real numbers because there are different real number systems used by Amiga software.

3. String: a stream of any valid ASCII characters enclosed by quotes. For example, "Hello there" (the quotes DO appear in the file). How can Draw allow any valid character if quotes are used to enclose or mark the string? The trick is to use the backslash (\) character as a marker. For example if a string reads:

   Drawing of "French Style" house

   It will get written out as:

   "Drawing of \"French Style\" house"

   The backslash tells Draw the next character is to be read into the string. Draw knows if a double quote (") follows a backslash (\), the quote is NOT the end of the string, the quote is to be included in the string.

   What about a backslash in a string? Draw uses the same rule as above, any character following a backslash is to be added to the string. If we have a string that reads.

   3′ 5″ Beam\Aged Oak

   It would translate to:

   "35\"Beam\\Aged Oak"

   This allows Draw to have any valid ASCII character in a string.

These are the basic building blocks of a Draw file. Draw uses Integers, Real Numbers, and Strings to write out the Drawing and Part files. Every object in Draw is composed of these pieces.

Drawings consist of graphical elements. Draw uses an object based approach. This approach treats every graphical object on an "equal basis." Lines, Arcs, Circles, Text, Dimensions, and Parts all share common data. This data is collected into an object called an Element. Every object in Draw is an Element. The element has a fixed piece of data called a Header. Additional information is used to hold the particular information for individual objects. For example, a Circle needs information on location and radius.

Draw "knows" what type of element it is dealing with by use of an "ID". Each type of graphical element has a unique ID. Some of the tools create the same type of graphical object. **Line**, **Polygon**, **Rectangle**, and **Freehand** all create Polygons.

The Element Header contains information on the size of the object, area it covers, color, layer, pattern, weight and flags. The diagram of an element follows:

ELEMENT

Integer ID, the ID of an object. The ID's are:

Polygon	1
Circle	2
Text	3
Dimension	4
Part	5
Arc	6

Integer SIZE, the number of bytes needed to store the element.

Real Numbers MIN-X, MIN-Y, MAX-X, MAX-Y. These four real numbers represent the area an element occupies in a drawing. A Polygon that runs from coordinate 0,0 to 10,20 would have values 0,0,10,20 as the MIN-X, MIN-Y, MAX-X, MAX-Y real numbers. Draw uses this information to determine if an element is in a particular area of the drawing.

Integer COLOR, the pen number of the element. This varies from 0 to 255. The current Draw program lets you select colors from 0 to 16, this may change in the future.

Integer LAYER, the layer the element resides on. There are 250 layers in Draw, 0 thru 249. Layer A0 is number 0, layer A9 is number 8, layer B0 is number 9... and so on.

Integer PATTERN, the line/fill pattern the element uses. If the element is filled the number runs from 0 to 7. Zero is the solid pattern. If the element is not filled the number runs from 0 to 8. Zero is the solid line.

Integer WEIGHT, the line weight of the element. Zero implies single thickness. One is used for double thick lines. A weight of two for triple thick lines.

Integer FLAGS, information on the element. FLAGS consist of the following values added together.

Filled is On	1 (bit #0).
Smoothing	2 (bit #1).
FreeHand	8 (bit #3).

The bits in the flag are tested for these values. A smoothed, filled, freehanded element would have a value of 11.

After the header of the element is written to the file, Draw writes the rest of the element's data out. This data is specific to the type of the element. For each type of element the data follows.

POLYGON, a series of points. Draw moves the pen to the first coordinate, then draws to the coordinates that follow.

Integer CONTINUE, a 1 if there is a coordinate after this, 0 if this is the end of the coordinates.

Real Numbers X and Y. Coordinate values of this point.

This repeats until a CONTINUE value of O, which is NOT followed by the real numbers X and Y. An example might look like this:

1 33.2 245.1 1 100.001 32.5 0

These coordinates would result in a line drawn from 33.2,245.1 to 100.001,32.5 .

CIRCLE. Draw displays the circle as a series of lines (72).

Real Numbers X and Y. Coordinate values of the center of the circle.

Real Number RADIUS. The radius of the circle (distance from center to the edge).

ARC. Draw displays an arc as a series of lines, starting from a particular angle, and proceeding counter-clockwise to another angle. Draw uses a "right handed" Cartesian coordinate

system. Zero radians is in an "east" direction from the center. Draw uses radians for its angles, PI (3.14...) radians correspond to 180 degrees, a direction "west" from the center.

Real Numbers X and Y. Coordinate values of the center of the arc.

Real Number RADIUS. The radius of the arc (distance from center to the edge).

Real Numbers START-ANGLE, END-ANGLE. The starting and ending angles of the arc. Draw displays the arc in a counter-clockwise manner, from START-ANGLE to END-ANGLE. Value in radians.

TEXT. Draw displays the text as a series of lines. Text is displayed at a given angle (see above). Each character has a width and height.

Real Numbers X and Y. Origin of the text.

Real Numbers CHARACTER-WIDTH, CHARACTER-HEIGHT. The height and width of the individual characters. The height includes the descenders, the letters "pqg" have descenders.

Real Number ANGLE. The angle of rotation for the text. Value is in radians.

String TEXT. The actual string used by the text element.

DIMENSION. Draw displays a dimension line between two points. Draw always orients the text from left to right, and from bottom to top (if vertical).

Real Numbers START-X, START-Y, END-X, END-Y. The two points to measure the distance between.

Real Numbers CHARACTER-WIDTH, CHARACTER-HEIGHT. The height and width of the individual characters and arrows.

PART. Draw displays the part by using the elements that define the part, and resizing, rotating, and moving them to the location of the part.

String NAME. The unique name of the part's definition in this drawing. Each part refers to a part definition in the drawing.

Real Numbers X and Y. Location of the part.

Real Numbers SCALE-X, SCALE-Y. Scale factors for the part. A value of 1.0 implies full scale, 2.0 would be twice the size.

Real Number ANGLE. The angle of rotation for the part.

Integer FLAGS, not used currently. Should have a value of 0.

When Draw writes out a series of elements, it terminates the elements with an integer value of -1. No other values follow this. If you read an element ID of -1, you have reached the end of a list of elements. Do not read any element information beyond the ID, until you have checked the ID against a terminating value of -1.

Parts use a Part Definition. The Part Definition is a list of elements, with additional information, such as the unique name of the part. The part definition is filed as follows:

Part Definition. What the part is made up of. Only used once in a drawing. Every part definition must have a unique name.

Integer COUNT. Not used currently. May be used to hold the number of times this part definition is being used in the drawing.

String NAME. The unique name of the part definition. This is the name you see in the **Parts** requestor. The part element's NAME lets Draw know what part definition the part is using.

Real Numbers MIN-X, MIN-Y, MAX-X, MAX-Y. These four real numbers represent the area a part definition occupies in a drawing. If a part that used this definition had a scale of 1.0 by 1.0, and angle of 0.0, at a location of (0,0), this would be the min/max values of that part.

A list of Elements that make up the part terminated by a integer of -1 (as described above). No Part should be in this list in Aegis Draw.

The drawing contains a list of the part definitions used. Each part definition is preceded by an integer of value zero. As with a list of elements, the list of parts is terminated with an integer of -1. This would look like:

0 (Part Definition) 0 (Part Definition)... -1

Finally here is the format of a drawing.

DRAWING

Integer MAGIC#. MAGIC# must be equal to the value 32086. Draw uses this to make sure it is dealing with a Drawing file.

Real Numbers X,Y. The lower left origin of the drawing.

Real Numbers WIDTH, HEIGHT. The size of the drawing.

Integer FLAGS. Not used currently, should be set to 0.

Real Number SCALE. Number of units that correspond to one inch on the plotter.

String NAME. The name of the drawing.

A list of the part definitions.

A list of the elements the drawing contains.

The Part file is simply this:

PART

Integer MAGIC#. MAGIC# must be equal to the value 40186. Draw uses this to make sure it is dealing with a Part file.

A part definition.

If there are no part definitions in a drawing, Draw will write out the -1 to terminate the list of part definitions. Draw will check to see

that a part's definition exists before it adds the part to the drawing's list of elements.

Aegis is actively seeking submissions of software which compliments Aegis Draw. If you need more technical information send your requests to:

Amiga Product Support Group
2210 Wilshire Blvd., Suite 277
Santa Monica, Ca. 90403

APPENDIX

D Common AmigaDOS Commands

The following commands operate from the CLI (Command Line Interpreter).

Directories

Draw has two directories on disk directly related to the program. One is labeled "Part" and is used for storing all parts. "Drawing", is for drawing files. The directories are not required but are only supplied as a method of keeping files sorted.

To select a directory for use in the CLI type: **CD: Parts**

This makes the directory "Parts" active. This is like opening a drawer in a file cabinet. The files in the directory are now available for use.

To see a list of files and directories or sub-directories type: **Dir**

This will list the names of all the files in the currently active directory.

To see a more detailed listing type: **List**

Using Devices

The most often used devices are the disk drives. To access a drive use the change directory command but add a drive identifier to it. For example, the internal drive is 0 (zero) and the external drive is 1 (one).

To switch from drive 0 to 1 type: **CD DF1:Parts**

This command will access the "Parts" directory on drive 1.

Other devices you may want to access directly are printers and plotters. For example, if there is enough disk space when Draw plots a drawing it will create a plot file on disk. This is an ASCII text file made of plotter commands. This file may be sent to a plotter directly from the CLI. This way you can create plots without Draw.

To send this file directly to the plotter type: **copy DrawPlotDump to par:**

This would send the content of the file to the parallel port of the computer. If your plotter is connected to the serial port you would want to modify the last part of the command to "ser:".

Sending the file to the serial port would look like this: **copy DrawPlotDump to ser:**

Another important device is an internal memory area known as RAM:. RAM: acts like a disk drive but it is actually a space in memory. It supports all of the file handling commands. This device is particularly handy if you only have one disk drive. With RAM: you can copy files from drive 0 to RAM: change disks and copy files from RAM: to drive 0. This way you can move files between disks with only one drive.

To copy a file to RAM: type: **copy FILENAME to RAM:**

Formatting a Disk

A disk must first be formatted before it can be used. Formatting a disk with data on it will completely erase the disk. The format function is a program stored in the "C" directory. You must first change to that directory or call the program directly.

There are two parameters to the command, Drive and Name. They specify the drive the disk to format is in and the name to give the disk after it is formatted. If you use a space in the disk name you must enclose the name in quotes. Warning! The Format command completely erases any data on the disk.

To format a disk without changing directories type:
c/FORMAT DRIVE drivename NAME diskname

Example: **c/format drive df0: name mydisk**

The example formats the disk in drive 0 and gives it the name "mydisk". If you switch directories to "C" then the "c/" part of the command is not needed.

Copying Disks and Files

The Diskcopy command is located in the "C" directory so to use it you must either call it directly or change directories.

To copy one disk to another without changing directories type:
C/DISKCOPY drivename TO drivename

Example: **c/diskcopy df0: to df1:**

The example will copy the disk in drive 0 COMPLETELY onto the disk in drive 1. Warning! Any data on the disk in drive 1 will be erased by this command.

Copying a file to another disk is a simple matter. If you have two drives the command is direct. If you only have one you must first copy the file to the RAM: disk, swap disks in the drive, and then copy it from RAM: to DF0:.

To copy a file with two drives type: **COPY filename TO drivename**

Example: **copy myfile to df1:**

The example copies the file "myfile" to the main directory of drive 1. To copy the file to a specific directory just add the directory name to the drive name.

To copy a file with one drive: **COPY filename TO RAM:**

(When the drive light goes out swap disks)
CD RAM:
COPY filename TO DF0:
CD DF0:

Check your Amiga user's guide for more information on copying files and using DOS commands.

APPENDIX

E Creating a Plotter Driver for Aegis Draw

The Aegis Draw program is configured for a Roland DXY980 plotter running RD-GL (an HPGL equivalent). If your plotter differs from this, you will need to create a plotter driver for Draw.

When Draw first starts up, it looks for a file titled "PlotDriver". If the file is found, Draw will load up the information it needs from it. If the file "PlotDriver" cannot be found, Draw will use the default Roland RD-GL driver.

The "PlotDriver" file is an ASCII file made up of the same building blocks as Drawing and Part files. The building blocks are Integers, Real Numbers, and Strings (see Appendix C). "PlotDriver" enables Draw to configure itself to almost any plotter. Draw does assume some conventions about the plotter. The minimum requirements are:

1. The Plotter accepts ASCII commands. These commands can be followed with an <end of line> character (<CR> or <CR>/<LF>).

2. The Plotter has an origin in the lower left corner of the paper.

3. The Plotter accepts movement and drawing commands of the form string interger(x) string interger(y) string <end of line>. For an HPGL plotter, a draw command would read as follows:

   PD;PA 100,200;

   This command will cause the plotter to draw a line to 100,200 in plotter units.

4. The Plotter can be connected to the serial or parallel port, and can be interfaced as one of the printers in Preferences. Most plotters will work with almost any of the printer selections. Draw does not send escape or control characters to the plotter. Draw only sends text to the plotter. Baud rate and connection for the serial port are set in Preferences.

To support optional plotter features (color, line patterns, etc.), Draw needs additional information on the plotter.

1. The number of pens, and the number of the first pen. Draw's colors run from 0 to 255, Plotter pens often run from 1 to 8 (e.g. 8 pen plotter).

2. Draw assumes that the color (select pen) command is of the form string interger(color) string. To select pen 5, in HPGL, the command would read:

   SP 5;

3. In order for line patterns to be used in plots, Draw needs to have the 9 commands that set the line pattern to the correct value. These commands are assumed to be a string. To get a dotted line in HPGL the command would read:

   LT1;

Draw needs to have information on the plotter's resolution. "PlotDriver" stores this as a Real Number, corresponding to the number of plotter units per inch of paper. For the Roland DXY 980 this value is 1000.0. Draw also needs to have the thickness of the pen tip, in inches. This is typically a value of .01 or .02 inches. Draw uses the pen thickness to draw the "double thick" and "triple thick" lines on the plotter. Draw also uses this "thickness" to hatchfill shapes properly.

Draw also needs the size of the plotting surface, in inches. This is typically smaller than the size of the paper. Draw uses this to insure that the user does not overwrite the paper.

PlotDriver.

The format of the PlotDriver file follows. NOTE: It requires some expertise to create a file with these commands. Aegis will provide driver files for every plotter we can obtain for testing. Contact us if you have special requirements. Each of the components of the PlotDriver file can be on a separate line. This is optional but it does improve readability. Every PlotDriver file must have all these components. Color and Pattern strings can be set to "", if the plotter does not support these functions.

Magic Number, an Integer of value 42586. This allows Draw to verify that the file is a proper plot driver file.

Resolution, a Real Number. The number of plotter units in one inch. For an HPGL plotter this may be 1000.0.

Width, a Real Number. The width of the plotting surface in inches. Draw assumes that 0,0 (the plotter origin) is the lower left corner of the paper. You should allow for margins.

Height, a Real Number. The height of the plotting surface in inches.

Thickness, a Real Number. The number of inches that equal the pen thickness of the plotter. Typically .02 inches.

Starting Pen, an Integer. The number of the first pen for the plotter. This is ignored for single pen plotters, BUT must be included in the file.

Number Pens, an Integer. The number of pens for the plotter. Must be included, even for single pen plotters.

Plotter Setup, a String. The command to initilize the plotter.

Plotter Cleanup, a String. The command to "clean up" after a plot. This may be the command that caps the pens, or "homes" the pen after a plot.

Move Command, a String. The command to lift the pen and move to an absolute coordinate on the plotter. The first part of the command (e.g. "PU;PA ").

Move Separator, the String that separates the digits in the move command. For example "," ... a comma.

Move Terminator, the String the ends the move command. For example ";", a semicolon. Draw allways sends a <end of line> sequence after a command.

Draw Command, a String. The command to lift the pen and draw to an absolute coordinate on the plotter. The first part of the command (e.g. "PD;PA ").

Draw Separator, the String that separates the digits in the draw command. For example "," ... a comma.

Draw Terminator, the String the ends the draw command. For example ";", a semicolon.

Color Command, a String. The command to change the pen. The first part of the command. (e.g. "SP "). If the color command is a NULL string (e.g. ""), Draw assumes the plotter has only one pen.

Color Terminator, the String the ends the color command. For example ";", a semicolon.

Line Patterns, 9 strings that set the line patterns. For example "LT 1". If Draw sees a NULL string "", Draw assumes that line patterns are not an option for this plotter. The PlotDriver file must have these 9 strings in the file.

Here is an example of a PlotDriver file for a RolandDG DXY 980 running RD-GL (HPGL equlivant). The commands have been grouped on separate lines for readability.

```
42586
1000.0 15.0 10.0 .02
1 8
"DF;"   ""
"PU;PA "   ", "   ";"
"PD;PA "   ", "   ";"
"SP "   ";"
"LT;"
"LT 3,3;"
"LT 2;"
"LT 2,1;"
"LT 4;"
"LT 5;"
"LT 1;"
"LT 6;"
"LT 3;"
```

GLOSSARY

AmigaDOS — The Amiga Disk Operating System.

Cancel — To back out of an operation without performing any action. Usually performed by pressing the Menu (right) mouse button.

choose — To pick a menu item. You normally choose menu items with the Menu button.

click — To press and release a mouse button.

clipboard — An area in memory that works as a temporary holding space. Items may be cut or copied from drawings into this area for later pasting into the same or other drawings.

Clone — To make a copy or duplicate of an object. Performed by selecting **Clone** from the **Tools** menu.

close — To remove a window or requestor from the display. To put away a tool, drawing, or file.

color — In this manual it usually refers to one of the slots in the Color Map.

Color Bar — The set of colors available for use displayed as a bar. These appear in the Color Menu and the Color Modify Requestor. Also known as the Color Palette.

Color/Map — A table used to translate from the numerical representation of data in the computer to the representation as colors on the screen. The Color Map can be thought of as a series of ink wells numbered from left to right. The type of ink in the wells can change, but a drawing that calls for ink 0 will use the ink from the left-most bottle. Individual Color Maps can be stored on disk as a ".col" file (color).

Color Requestor — The requestor you use to change the colors in the Color Palette. Reached by selecting **Modify Color** from the **Color** menu.

copy — Refers to an editing process where items are duplicated from a drawing into the clipboard.

cursor — The icon that moves on the screen when you move the mouse. you use it to select menu items, work gadgets, create objects, etc.

cut — Refers to an editing process where items are removed from a drawing and moved to the clipboard.

disk — A magnetic medium for storing and retrieving information. The little plastic things with the metal strip that opens and closes.

edit field — An area usually found on a requestor where text data is entered. All text information, the backspace key, and the arrow keys may be used inside the field. You gain entrance to an edit field by clicking on it.

filled — Refers to objects displayed in a drawing. If they are filled they appear solid or contain a pattern.

fill pattern — One of eight patterns ranging from solid to mesh weave used to fill objects in a drawing. Used in conjunction with the **Filled** preference under the **Preferences** menu. You change the fill pattern by selecting **Fill Pattern** from the **Options** menu.

highlight — To display something in a way that distinguishes it. Normally, something is highlighted to indicate it is selected.

icon — A visual representation of a tool or function.

Menu Bar — A strip at the top of the screen containing menu titles and instructions for the selected function.

Menu button — The right hand button on the mouse.

Object — Any thing such as a line, circle or polygon that can be isolated and moved. This includes multiple objects grouped together as a part.

open — 1. To make a tool availble for use. 2. To retrieve a file stored on disk. 3. To display a window or requestor.

Pendown — Pressing down on the Selection (left) mouse button.

Penup — Releasing pressure on the Selection (left) mouse button.

Pixel — One of the individual points that make an image on the screen.

Polygon — An object defined by a number of points and straight lines between these points.

requestor — A bounded region on a screen used to give information to a tool or drawing. It appears as a window when you select certain tools. Most requestors have gadgets that control different aspects of the tool. When you quit Draw a requestor appears asking if you really want to leave. There are two buttons "Quit" and "No" to answer the request.

save — To copy something to a file on disk.

Screen — The display area of the monitor, or the rastor that holds the background and all other objects drawn on top of the background.

select — To pick an object or gadget by pointing to it with the cursor and pressing the Selection button.

slider — A gadget you use to pick within a range by dragging a marker along a line.

window — 1. Program window, the current window Draw is running in on the Amiga. 2. Drawing window, a work area where drawings are made. Each window contains one drawing. 3. Requestor window, a requestor area on the screen, see requestor.

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